

**OVERSIGHT OF CLEANUP AND MODERNIZATION
PROPOSALS FOR DOE'S WEAPONS
PRODUCTION COMPLEX**

**HEARINGS
BEFORE THE
COMMITTEE ON
GOVERNMENTAL AFFAIRS
UNITED STATES SENATE
ONE HUNDRED FIRST CONGRESS**

FIRST SESSION

JANUARY 25, 26, 1989

Printed for the use of the Committee on Governmental Affairs



U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1989

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

540147

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OVERSIGHT OF CLEANUP AND MODERNIZATION PROPOSALS FOR DOE'S WEAPONS PRODUCTION COMPLEX

WEDNESDAY, JANUARY 25, 1989

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, DC.

The Committee met, pursuant to notice, at 9:30 a.m., in room SD-342, Dirksen Senate Office Building, Hon. John Glenn (Chairman of the Committee) presiding.

Present: Senators Glenn, Roth, Bingaman, Lieberman, and Kohl.

OPENING STATEMENT OF CHAIRMAN GLENN

Chairman GLENN. The hearing will be in order.

As the one hundred and first Congress and the Bush administration begin to address the major challenges facing our Nation, among the most serious is the need to maintain our nuclear deterrent without sacrificing our land and poisoning our people. In this regard, today's hearings mark an important milestone in the course of U.S. nuclear weapons policies.

With a land base larger than Delaware and Rhode Island combined, the nuclear weapons production complex is among the Nation's largest and, potentially, most dangerous industries. As events of the past several months clearly demonstrate, it's an industry which has thrust our country into a crisis of major proportions.

For the first time since World War Two, the U.S. Government has been forced to suspend production of nuclear warhead materials at several facilities. Failure to resume production of tritium, a perishable warhead fuel, could possibly force the Government to cannibalize some part of our nuclear arsenal as an alternative to risking serious accidents at DOE's aging production reactors. This could unilaterally reduce our nuclear deterrent.

The health of large numbers of Americans may have been put at risk from nuclear weapons activities. At DOE's Fernald facility, for example, a uranium foundry near Cincinnati, Ohio, hundreds of tons of potentially dangerous uranium and unknown amounts of hazardous chemicals were released into the environment. The people who live nearby or work at Fernald now live with the fear that their health and that of their children may already have been affected. Years have passed, and no clear answers about this disturbing problem are forthcoming.

The situation at Fernald, I would add, is bad enough, but once we started looking into it, we realized that Fernald is a microcosm of the whole nuclear weapons complex, not the exception.

Enormous quantities of radioactive and toxic wastes have accumulated at several DOE sites around the country, posing one of the most serious and difficult environmental challenges our Nation now confronts. Billions of gallons of radioactive and toxic wastes have been dumped into the soils at DOE sites, creating severe pockets of contamination.

How could this happen? Secrecy, self-regulation, decentralized management and isolation—the products of the 1950's cold war era have contributed enormously to the problem. Back in the fifties nuclear weapons production was first and foremost—I was one that supported that. "The Russians are coming! Produce. Dump the wastes in the pit out back. We'll worry about them later." Well, now is now later and the poisonous waste legacies stagger the imagination.

Now adding insult to possible injury, DOE proposes to close several of its operations without clear-cut guarantees that the radioactive and toxic legacies it leaves behind will be cleaned up. The notion that we must sacrifice large areas of our homeland is totally unacceptable. The cleanup must proceed, and it's never going to be cheaper than it is now to correct this problem.

It has been a multi-year struggle—I mean over quite a few years, too—to have the Energy Department provide reasonably accurate cost estimates to modernize and clean up its sites. A few years ago—I think about 3½ years ago, to be a little more exact—the estimates started at around \$6 to \$8 billion, and the next year it was up to \$12 to \$15 billion. With every revision and new revelations about the mess, those estimates have risen dramatically.

Now, with the release of the most recent DOE reports on modernization and cleanup, we find the costs of addressing these problems are truly staggering. Unfortunately, the "2010 Study," as it's called, DOE's modernization plan of what the whole complex should look like by the year 2010, is shortchanging cleanup at the expense of production.¹ That's the policy that got us into this mess in the first place.

According to estimates provided by DOE and, independently, by the General Accounting Office, at my request, as much as an additional \$150 billion may be needed for environmental, safety and health improvements over a 20- to 30-year period.

To the credit of out-going Energy Secretary Herrington, several important initiatives to tackle these problems have been started. DOE has, for the first time, attempted to determine the size and scope of nuclear weapons production at the beginning of the next century. An assessment of the long-term spending needs for environmental, safety and health improvements has also been provided. It's a good start—just that, a start.

Also, a small number of talented and dedicated individuals have been brought into the agency who are starting to address these

¹ See p. 348 for the 2010 Study.

often frustrating and very difficult problems. It's clear that we will need to rapidly build upon these efforts.

Specifically, the DOE needs to provide a detailed road map to get its weapons program to the next century. This means that DOE must develop a detailed program for modernization and upgrading of current facilities essential to our nuclear deterrent. This program should have specific criteria, milestones and cost estimates. The program must be driven largely by detailed technical appraisals by DOE's Office of Environment, Safety and Health.

Most importantly, there needs to be independent peer review of this process. We have over 30 GAO reports and numerous Congressional hearings which have demonstrated that independent oversight is a needed element if DOE is to effectively carry out its competing missions of production and safety. The Defense Nuclear Facilities Safety Board, which was created last year by law, is just the first step in a long journey toward accountability. It is essential that this board be assembled in a timely manner and with competent and objective people. We intend to ensure that this will happen.

The need for independent regulation and oversight is underscored by today's revelations in the paper—just read it for the first time a few minutes ago myself—about the K-Reactor at DOE's Savannah River Plant in South Carolina. Last Sunday during a test of the reactor's secondary coolant system, valves were damaged and procedures were violated that caused that kind of damage.

Moreover, DOE's safety officials were not informed of the mishap until yesterday. These were the same elementary and basic problems we uncovered at the September 30th hearings last year. Now it appears that the reopening of the K-Reactor, at least, could be further delayed, which does not bode well for our national security situation.

It seems that the more things change, the more they stay the same. The DOE is going to have to do a lot more than just issue new procedures and spend more money on equipment to correct these critically important deficiencies. As has been clear all along, President Bush and incoming DOE Secretary Watkins will have to make fundamental changes in management if we are going to avoid these problems in the future.

Second, the Bush Administration must not continue the policies of its predecessors, which clearly placed production ahead of environment, safety and health. The Reagan Fiscal 1990 DOE budget request falls short of adequately addressing environmental, safety and health needs by far. Realistically, the ESH spending within DOE should be doubled, at the minimum, over what was requested this year in order to start tackling the problem—just to start tackling the problem.

Third, the DOE must undergo independent regulation and oversight of its environmental, safety and health activities. If we are going to avoid the mistakes of the past, we must aim toward ensuring that nuclear weapons production operates under the same standards required of the private sector, and it can do that. There's no reason not to do that.

Perpetuating DOE's environment, safety and health "outlaw" status, as someone termed it, not only creates unacceptable risks, it

also undermines the integrity of the nation's laws. In this era of major environmental problems, DOE should not continue to be among our Nation's most serious polluters.

Finally, we must recognize that the safe and environmentally sound production of nuclear weapons will not be cheap. It's necessary but it won't be cheap. I back the requirement fully to get the tritium, in particular, that we need and we need now, as soon as possible. But we don't need to do it by sacrificing the environment and poisoning our own people. The costs of correcting these problems is enormous, but the cost of doing nothing will be ever greater.

It's my hope that the Congress and the Bush Administration can work together to forge policies that will guarantee our nation's defense but, at the same time, without sacrificing the health and environment of our people in the process.

Senator BINGAMAN, do you have any opening remarks before we go to our witnesses?

OPENING STATEMENT OF SENATOR BINGAMAN

Senator BINGAMAN. Mr. Chairman, I want to commend you for holding the hearings. I think it involves a very important set of issues. These are issues that will come not only before this Committee but, of course, the Armed Services Committee, the Energy Committee, and I think they will take up a great deal of our time during this Congress. I think it is crucial that we find a way to move forward on both missions. I believe we need a nuclear weapons production capability in this country but we, obviously, need to do it in a safe manner.

I also think it's important that we put adequate emphasis on the research component to determine how to proceed. I think there is a temptation to think that enough cement and digging will solve this problem. I think that there is a real critical need to do the necessary research, not only to ensure that the safety problems are solved but that they are solved in a cost-effective manner. So I compliment you for holding the hearing. I look forward to the testimony.

Chairman GLENN. Thank you. I know we both have some dual commitments. I know you can't be here for the whole hearing. We have the Armed Services Committee meeting this morning also, and I'll just have to skip that or try to get over to the last part of it, perhaps. So I'd appreciate you being here for as much as you can today.

Senator Lieberman.

OPENING STATEMENT OF SENATOR LIEBERMAN -

Senator LIEBERMAN. Mr. Chairman, if I may very briefly, I just wanted to indicate to you and for the record how much I appreciate the opportunity to participate in these hearings, which I take to be extremely important, and also how much I appreciate the leadership that you have shown on this issue.

It seems to me that what is involved in these hearings is not only the alarming and specific facts of what's happened at the nuclear weapons production facilities under the control of the United

States. What we're raising here, again, is a fundamental question, which is, "Are we prepared to pay the price of progress, or in this case, the price of national security?"

Obviously, we've experienced tremendous technological development in our world, and that development has had environmental consequences that we've not been prepared or willing to face and accept. We face the question of whether we are going to leave our children with a world that is highly developed or, in this case, very secure, but one in which they cannot and will not be willing to live.

Those are, to me, the fundamental, underlying questions that are raised by these hearings. They are particularly intense questions because they concern the willingness of the Government itself, those of us who make the laws and implement them, to follow those laws and set a much better example than we obviously have set in the past.

May I say to you, Mr. Chairman, that though the facts that have come out about this problem do not give one confidence that we are going to be able to pay the price of progress or security, your leadership in this matter does give one confidence. If they gave a Nobel Prize for public service, I think you would deserve it on this one. Long ago—and I've been following this from a distance, and it's a real honor to be sitting here with you now as a newcomer involved in this—you saw something that was wrong.

You believed it was wrong before a lot of others were even aware of it or willing to acknowledge it, and you stuck with it until now, when it is universally acknowledged that something is wrong. I look forward to working under your leadership to see if Congress can make it right.

Chairman GLENN. Thank you very much. I appreciate those more than generous remarks.

Senator Kohl.

OPENING STATEMENT OF SENATOR KOHL

Senator KOHL. Well, I, too, am very pleased to be here this morning as a person who's come to Government for the first time. I think this will be, for me, a very timely issue because it's clear now that we have a severe environmental problem. Regardless of how we got here, we're here today. Too often Government, of course, is criticized for its inability to correct problems.

This is a clear and present danger. This is a problem that we know we have. It will be interesting and, I think, very informative and crucial to see how we deal with the problem that we're addressing this morning and how we can demonstrate to ourselves and to the people of this country that when we identify a problem and clearly are aware of it, that we are able to move ahead and effect some correction.

It would be a shame if this problem continues to fester, gets worse, does not get better. I think it would indicate that Government is just not able to do what it needs to do when it needs to do it. So I think these hearings are terribly important in that respect.

Chairman GLENN. Thank you very much.

We have as our lead-off witnesses this morning people who have done yeoman service for us in the past and continue to do so. We

have over 30 reports over the last 8 or 9 years at the General Accounting Office, which is the investigative arm of the Congress, has put together for us on various parts of the DOE nuclear weapons complex across the country, some of the deficiencies in that. Those have been spelled out in much detail to us through the year by a lot of great work by the General Accounting Office.

We have with us today from the GAO Mr. J. Dexter Peach, the Assistant Comptroller General; Keith O. Fultz, Associate Director, Resources and Community Economic Development Division, and Mr. Fenzel—what is your title?

Mr. FENZEL. Evaluator in Charge, Mr. Chairman.

Chairman GLENN. Very good. We look forward to your testimony, either in its entire version or an abridged version thereof. In either event, your entire testimony will be included in the record, Mr. Peach. Go ahead and proceed.

TESTIMONY OF J. DEXTER PEACH, ASSISTANT COMPTROLLER GENERAL, GENERAL ACCOUNTING OFFICE,¹ ACCOMPANIED BY KEITH O. FULTZ, ASSOCIATE DIRECTOR, AND WILLIAM F. FENZEL, EVALUATOR IN CHARGE

Mr. PEACH. Thank you, Mr. Chairman. I would like to proceed by pretty much walking through and, in some cases, highlighting my testimony because our purpose today in these hearings is to try to provide you, the committee, a perspective on how to view the 2010 Plan that has been put forth by the Department of Energy and what are some of the kind of questions that you should be asking, perhaps today, as you hear from their witnesses and in the months ahead.

Let me begin with just a couple of minutes of scene-setting in this area. It's about 2 years ago that this Committee, building off a body of GAO work that had been underway since 1981—and you mentioned a number of reports—outlined the safety and environmental problems which were facing an aging nuclear weapons complex. We pointed out that DOE didn't have an adequate plan for addressing the problems or assuring the Congress regarding meeting of the nation's need for nuclear material.

We called on DOE to develop such a plan, setting forth the projected facility requirements for an updated complex, a comprehensive picture of environment, safety and health issues, and a framework for prioritizing the billions of dollars in Federal expenditures needed to remodel or build new facilities, as well as to clean up the environmental contamination.

Over the last 2 years, we've learned more about the significance of the problems. We revised the estimates of what it would cost to modernize and clean up the complex from billions to between \$100 and \$155 billion. Let me stress that while these estimates have evolved over the past few years, they are not budget quality, but clearly indicate the formidable size of the challenge ahead and the cost of dealing with the problem. And, as we have told you before, all indications are that the final cost of modernizing the complex

¹ See p. 113 for Mr. Peach's prepared statement.

could be higher than these estimates as we better understand the scope of the problems that must be dealt with.

Now Congress, later that year, mandated the President develop a plan to modernize the complex, and that was the plan that was delivered to you in January; and in the previous month, DOE gave you a report, Mr. Chairman, which you requested separately, detailing environment, health and safety needs of all its facilities, including the nuclear weapons complex.

Since those hearings 2 years ago, as well as others that have been conducted, DOE has recognized, through its public statements and now through these reports, that serious problems do exist within its complex. In fact, while DOE was further identifying or characterizing the extent of the problems in the complex, safety problems surfaced which have, in effect, shut down the nation's ability to produce nuclear material for weapons.

These problems include: January 1987, the N-Reactor temporarily shut down to upgrade safety systems. Safety upgrades have now been suspended and the reactor is being maintained in cold, standby status, with no plans for restarting it. In August of 1988, the P-Reactor at Savannah River was shut down amid concerns about the need for improvement in operator training and procedures, technical specifications and DOE and contractor management of reactor operations.

You mentioned in your opening statement this morning's newspaper article and the parallels between the problems described in that article and the kinds of problems that occurred last August with respect to operator training. I think it is a good message to all of us that whatever we do to modernize the complex, whatever we do to clean up the problems, you also have to deal with the human factor in how these facilities are actually run. You've got to build in the right kind of safety culture and the right kind of attention to detail among the employers and the managers of the organizations that are responsible.

Subsequently, at the P-Reactor, there was evidence of cracks in primary cooling systems of the reactors—reactors at Savannah River. This is in addition to problems of the emergency core cooling system and the continuing need for ultrasonic testing of the reactor tanks, both of which we highlighted before this Committee in March 1987. All three reactors at Savannah River are down while DOE finalizes its plans to address these and other concerns. The present plans are to restart at least one of the three reactors near the end of this year.

In October 1988, a major plutonium processing building at Rocky Flats was shut down because of safety concerns. DOE plans now to resume operations at this facility sometime this spring.

DOE has begun to learn more about the extent of the problems. Actions in the last year to hire technically qualified staff to investigate and report on the extent of contamination and safety problems that need to be addressed has been a real plus. It is encouraging that DOE has a program to assign permanent resident inspectors at its major facilities, permanent inspectors have been assigned at Savannah River and Rocky Flats only with one inspector on loan to Fernald until someone permanent can be hired.

These inspectors have been instrumental in disclosing significant safety problems at these facilities within the past several months and understanding the kind of safety problems that do exist, and they have clearly proven the worth of having resident inspectors at major weapons complex facilities.

As you begin this session of Congress, I think the important point is that the debate can now move from recognition that there are serious problems in a nuclear complex to how we can best deal with the problems. Your persistence for better information has been instrumental, Mr. Chairman, in the development of the two recent DOE reports which provide a beginning framework for the debate.

That is what the remainder of my testimony focuses on, trying to provide some perspective on the scope and direction of DOE's modernization and cleanup plans, the reasonableness of the cost estimates to address these plans and the structure needed to most effectively and efficiently solve the problems.

I should make it clear at this point, Mr. Chairman, that our comments today are based on our reading of the unclassified version of the plan, which we have had since it has been made available publicly. We only received very late yesterday the classified backup material for the plan, which we will be in the process of examining more closely over the course of the next several weeks.

Chairman GLENN. You have not had access to the classified version yet; is that correct?

Mr. PEACH. We received that classified version yesterday, late in the afternoon, at the secure facilities out in Germantown.

Chairman GLENN. Okay. Well, it was just delivered to the other committees, I think, late last Friday of last week sometime, I believe. We will be looking forward to your testimony on that, too, in closed session later on.

Mr. PEACH. All right. Let me talk, first, about the modernization. DOE must deal with modernizing its aging complex because of past mistakes, which we think include overemphasis on production, negligence in the environmental area and complacency with regard to safety.

While the modernization plan lays out DOE's view of what facilities will be needed in 2010 to meet production needs, it does not clearly define what environmental cleanup problems will be resolved during the same time frame. In addition, DOE's view of the complex will likely change as Congress assesses the plan and further information is developed.

By 2010, if the plan is followed, DOE will have upgraded many of its plants, including the plutonium infrastructure at Savannah River and uranium facilities at the Y-12 plant. DOE will have two new production reactors and a special isotope separation facility. Finally, DOE will have largely relocated or phased out other installations such as the Rocky Flats Plant and Fernald.

In our reading of the plan, it appears that modernization activities would essentially be completed by 2010 and the nation would have a revitalized weapons complex. However, problems in the environmental area would still be with us. In our opinion, the plan does not adequately address the cleanup of existing facilities and decontamination of facilities as they are retired from service. The

plan provides little perspective on how these important problem areas will be solved or what needs to be done in these areas between now and 2010.

While the plan does provide DOE's views on the future configuration of the complex, it is just a first step that raises a series of issues that Congress will need to consider. I mention these as questions that you might want to probe, Mr. Chairman, in terms of the kinds of things that need to be done within the complex.

Does the Nation need two production reactors? DOE's plan calls for two new reactors as a top priority. Reactors will be built at different sites and one will utilize a new technology.

Does DOE have the capability to meet nuclear material needs while the new reactors are being built? Currently, all the production reactors are shut down. It is unclear to what extent the reactors can be relied on in the future to produce nuclear material.

Should the special isotope separation facility be a priority? DOE's plan places high priority on this project which is to be used to convert fuel-grade plutonium to weapons-grade plutonium. Given the other planned upgrades of plutonium facilities within the complex, questions regarding the emphasis placed on these facilities would need to be addressed.

Are DOE's plans to upgrade facilities which it plans to later phase out appropriate? The plan calls for a number of upgrades at facilities it plans to shut down within several years. The tradeoffs between upgrade and shut down need to be carefully studied.

In addition to these and other questions, DOE's views on what the complex will look like in 2010 may be sufficiently altered as additional information becomes available. For example, in other recent reports—and I'm mostly familiar with these from the press—there is now a report within DOE that proposes that a linear accelerator could provide tritium more cheaply and sooner than a new production reactor. Such information could greatly change the direction of DOE's plan as that is evaluated.

In our view, as pictured by DOE in its plan, modernization is on a faster track than environmental cleanup and decontamination. DOE still has not made key decisions on the extent of environmental cleanup or which sites get cleaned up first. Also, the plan raises new issues that Congress must consider in addition to balancing modernization and cleanup needs. In other words, we believe, Mr. Chairman, the plan should only be viewed as a first step in establishing a consensus to rebuild and clean up the complex.

Now, let me talk about cost estimates. I want to briefly discuss the reasonableness of the cost estimates set forth in DOE's recent reports. In 1986, we reported it would cost billions to address the problems within the complex. In 1987, we reported the estimates had grown to tens of billions of dollars. In 1988, we reported the cost would likely be over \$100 billion to address the major problems.

Now we have three studies before us which suggest or specify costs far in excess of \$100 billion—and I would emphasize the words "suggest" or "specify" because the numbers start out at lower than \$100 billion in the DOE reports, but I think when you examine them more closely they still suggest figures that are above \$100 billion.

Chairman GLENN. Just in passing here, what time period are we talking about for that now? Has the time also changed or has the time remained reasonably constant, at something between 20 and 30 years?

Mr. PEACH. When we talked about it originally, we were talking about 20 to 30 years but, of course, in producing this plan that DOE now has, they are talking about 20 years, through 2010. But I think in some cases it represents, at this point a level of effort of what they expect to be willing to spend; not what the scope of the problem is that needs to be dealt with.

Chairman GLENN. Modernization in the 2010 plan is it just that? Are the environmental cleanup funds that we hope goes right along with modernization based on a 20-year estimate?

Mr. PEACH. Well, in the 2010 plan—it's based on 2010. That's the numbers that they show, although they include references indicating they expect it will go far beyond that time and the cost will be substantially higher.

Chairman GLENN. Thank you.

Mr. PEACH. Of the three reports, Mr. Chairman, we believe our report in July 1988, which provided those cost estimates ranging from \$100 billion to over \$155 billion, is the most comprehensive. The DOE studies differ in methodology and scope. For example, the DOE plan highlights \$81 billion for modernization and environmental restoration over the next 21 years. This \$81 billion represents the additional fund—an increment—needed during the next 21 years over and above the funding for DOE programs each year at the Fiscal Year 1989 level.

For example, DOE already has a large radioactive waste management program underway, currently allocated at more than a half billion dollars a year. The amount specified in the 2010 plan for this program—\$7.5 billion—reflects the additional costs needed above the half billion dollar annual expenditure for each of the next 21 years.

In the environmental restoration area, DOE recognized that costs would extend beyond 2010 and, in total, will range from \$40 billion to \$70 billion. The DOE Environmental, Safety and Health Needs Report, which you received in December, differs from the GAO report in one reason, primarily because it doesn't even address modernization activities.

It is important to note that all of these estimates are not budget quality and are designed only to roughly approximate the funds needed. In the final analysis, the true cost may be far higher. Many uncertainties exist with regard to how we can clean up existing environmental contamination and decontaminate large nuclear facilities.

The modernization plan does not shed much light on the extent DOE's sites will be cleaned up or what cleanup procedures will be used. Some of the planned facilities will utilize new technologies such as the isotope separation facility and the high temperature gas-cooled reactor. DOE's construction of such facilities has been prone to cost overruns. Further, the experience in building commercial reactors indicates the cost of new production reactors could be much higher than DOE's estimate of \$6.6 billion for two reactors.

Finally, we can't be sure that all the problems within the complex have surfaced. DOE still has not applied a detailed safety policy with accompanying standards throughout its complex. Once this is accomplished, it will likely reveal needed safety upgrades. In the environmental area, uncertainty still persists not only regarding the size of the problems, but the extent to which sites can be cleaned up.

Regarding the structure that DOE has to manage this massive rebuilding effort, which we have described as one of the largest industrial rehabilitation programs ever undertaken. It's important to ensure that past mistakes are not repeated. Some changes in the current structure may be warranted to acquire the necessary technical expertise, provide strong safety oversight and establish needed policies and procedures as a basis to manage the modernization effort.

If you look at technical expertise, in 1981, a DOE task force looking at the Three Mile Island accident criticized DOE for not having sufficient technical resources to manage its nuclear facilities. This criticism was repeated in October 1987 National Academy of Sciences report on DOE's production reactors. Sufficient technical resources are needed to undertake the modernization effort.

In addition, DOE must continue to hire quality technical people to manage and oversee on-going operations. For example, the Office of the Assistant Secretary for Environment, Safety and Health must continue its program to place resident inspectors at DOE facilities. I noted earlier that these inspectors have been the key to understanding and characterizing safety problems. So we believe the question is open as to whether DOE has sufficient technical expertise to accomplish the tasks ahead, and we think they will continue to need to move forward in that area.

Also, we have long supported the need for an independent organization outside the control of DOE that oversees the agency's internal safety program. Public Law past last year, primarily as a result of the persistence of this Committee, led to the creation of the Defense Nuclear Facilities Safety Board. We still are concerned that the Board would exclude certain weapons facilities from the oversight, including the Pantex facility and the Nevada Test Site. We think their ability to look at areas within the complex operations should be complete.

Finally, all the necessary policies and standards are not currently in place to guide the modernization effort. In our July 1988 report, we recommended that DOE establish a meaningful safety policy, related standards and implementation policies to guide continued operations. These policies and standards could be used as a baseline safety criteria for developing future strategy for the weapons complex.

A safety policy has been in draft since May of 1988. DOE believes it will be issued in a few months. The detailed implementing procedures are expected to be issued sometime after the policy. Once they are in place, DOE will apply them to existing facilities and to the design for new facilities. As I said earlier, this could well entail safety upgrades which would increase the cost estimated in 2010 modernization plan.

Also, as the debate continues, other questions concerning DOE's structure will be raised. These could include: Is DOE's current organizational structure for managing its nuclear complex appropriate? For example, to ensure that there is proper balance between production and environment, should DOE establish a separate office to manage the environmental cleanup effort. And should safety upgrades be separated from operational funds in the budget, like DOE has separated environmental cleanup, so that the level of funding for safety and specific safety-related projects can be clearly and separately tracked?

To summarize, Mr. Chairman, the 2010 plan brings DOE and Congress to an important crossroads, that of beginning to make critical decisions about the balance between restructuring the complex to provide new production capability; assuring that new and existing facilities meet environmental, health and safety laws and regulations; and cleaning up the result of years of environmental contamination.

These decisions need to be made within the framework of conflicting demands for limited resources necessitated by the budget deficit while recognizing that nuclear material from the complex is critical to our national defense. We at GAO are very cognizant and concerned about those kinds of tradeoffs, as we talked about at some length in the testimony before this Committee, where I accompanied the Comptroller General, on the problems facing the U.S. and the budget deficit issues.

The 2010 modernization plan is a first step in framing the debate. We have a better understanding of the problems facing the complex; however, DOE is continuing to develop information on the extent of the problems and to address and prioritize what needs to be done to correct them. While all the problems are not completely understood, the national debate can now widen to finding solutions. We expect, because of the enormous costs, Congress will be making decisions about the complex for many years.

DOE can assist the Congress in its deliberations in future years by periodically updating the 2010 modernization plan. Safety upgrades resulting from the application of safety policy and reprioritization of environmental cleanup activities resulting from completing the environmental surveys are just two reasons for an update. Such an update would keep the Congress and the public informed on the overall direction, priorities and progress DOE is making as the modernization effort continues. Any subsequent plan should also include a discussion about how DOE is structured to ensure that all operations are safely carried out in an environmentally acceptable manner.

That concludes my statement, Mr. Chairman. I and my colleagues would be pleased to respond to the questions of you and other Committee members.

Chairman GLENN. Fine. Mr. Fultz, do you have any additional statement?

Mr. FULTZ. Nothing additional.

Chairman GLENN. Mr. Fenzel?

Mr. FENZEL. No, sir.

Chairman GLENN. Fine. Let me just make about a minute of comment here on the different reports that we had before we get to

questions. It gets a little confusing to people who aren't familiar with this and working in it every day as to the number of different reports and all the different references we have to them.

We have a Needs Report, an Environment, Safety and Health Needs Report. That was called the December Report, as such, and that report was prepared at our urging. It assesses the funding needs for cleanup and restoration of all DOE nuclear sites into the future. Now, the funding figures range from a low of \$91 billion to \$200 billion for that. They don't include some \$23 billion in costs associated with radioactive waste management. Now that report, the ES&H Needs Report was put out in two parts, Volume One and Volume Two. It gets a little confusing.

Volume One was to assess the funding needs overall and Volume Two, then, which we've just had for about 10 days or so, details the cleanup cost on a site-specific basis. It tries to go through and say what's needed and then, hopefully, prioritize some of it site by site across the country.

Then we have a separate report called the "2010 Report," which is DOE's report on the modernization and future of the whole weapons complex.¹ That estimate of what's going to be required on is \$81 billion to modernize and effect environmental restoration over the next 20 or 21 years. Of that amount, about \$52 billion is to be spent on modernization, \$29 billion for environment, safety and health corrective actions. Now, that \$29 billion is about onequarter of DOE's own original estimate given last summer and is about one-sixth of what the General Accounting Office indicated will be necessary in a similar report to us last July.

Another study is the Prioritization Study. DOE prepared this study to give priority rank for the cleanup of the bomb program sites, and the report ranks 155 instances of contamination at 16 weapons plants and labs in the order of potential hazard they pose to the public.

Last but certainly the most important is DOE's budget request. Their budget request for environment, safety and health programs was \$1.4 billion, a figure that's at least \$400 million short of what Secretary Harrington indicated in the press was needed. DOE's site need assessment would be required to accomplish even basic program spending. So there would be comparable shortfalls existing on a site-specific basis, as well. Those are, roughly, the reports that we are talking about and are referred to here.

Mr. Peach, would you discuss the cost differences between GAO's July 1988 \$100 billion report and DOE's 2010 report?

Mr. PEACH. I think, Mr. Chairman, perhaps the easiest way to do that, if I could ask you to refer to page 15 of my statement, if you have a copy of that there. We included an appendix on page 15 of the statement which is a reconciliation of the cost estimates included in those two reports.

Just to walk down those cost estimates, the first element involved is the upgrading of existing capabilities plus modernization. In our July report, we included a range of \$35 to \$45 billion and in the DOE 2010 report, they come in at about \$44.7 billion. So those

¹ See p. 348.

are roughly comparable within the ranges, although we have not had the opportunity to look at that supporting documentation in the 2010 report which was in the classified version of the material that we now have.

If you look at disposal of radioactive waste, we had a figure of \$30 billion and they had a figure of \$7.5 billion in their 2010 report. That \$7.5 billion represents the incremental costs above what they were already spending to deal with radioactive waste. Radioactive waste was one of the areas where they did already have money in their budget and had a program underway for some time to try to deal with that problem area. We, in trying to show the cost of dealing with the environmental and other problems at the complex, included the cost of dealing with the radioactive waste problem, both additional cost plus what was being expended.

In the decontamination area, we had a figure of \$15 billion and they have a figure of \$4.7 billion, representing additional incremental costs for decontamination. But I would point out to you that they are only including a decontamination cost estimate for facilities they now have as inactive which they are looking to decontaminate. They are proposing in this plan to phase out activities at places like Fernald, at Rocky Flats, and there will be other facilities that will have to be decontaminated, and there are no cost estimates in there for those.

We were trying to reflect an element of the cost for decontamination, recognizing that is a very uncertain area and there are widening estimates about what it may cost, depending on what type of method you decide to use when you go in to decontaminate. Are you going to entomb something in place and try to keep it under long-term care or are you going to dismantle it to try to bring it back to the condition that it was before? Those are the kinds of issues that have to be confronted there.

Lastly, in the environmental restoration area, we included a range of \$35 to \$65 billion and they include an estimate of \$24.1 billion, according to our looking at the 2010 report. Their estimate—the differences there are that they really seem to be reflecting, as we see it, a level of effort of what they are willing to spend. There's a recognition in their study that there will be environmental restoration going on beyond 2010, and they include a range of \$40 to \$70 billion totally to deal with the problem.

I guess what I'm saying to you, if you take their \$81 billion figure and you begin to add to it the total scope of environmental restoration activities and you begin to add to it decommissioning and decontamination type activities, you are well up over the \$100 billion range again. And of course, as I've said, the radioactive waste area is also an area that we accounted for fully as opposed to not just counting for the incremental costs.

We aren't backing away from our estimate earlier we said of \$100 to \$155 billion as being the range of costs, but that is a very uncertain figure.

Chairman GLENN. When we talk about restoration at these sites, are we talking about restoring them to green field original status that you wouldn't need to worry about, or are we talking about the requirement at some places, perhaps, to leave certain areas in place right there that will be there for the indefinite future?

What's this based on? If you do it to green field status and have to move everything, every gallon, every piece of dirt that has any contamination out to another site clear across country, obviously, the costs are enormously increased. What level of cleanup are we talking about with these estimates that both you and DOE have suggested?

Mr. PEACH. I think you're talking about a very uncertain question. I think that issue is going to have to be confronted at a lot of facilities. I do not have a good answer for you. I suspect they will be facilities where you're looking at moving it to another site or location. You are right that that gets to be very expensive. There may be facilities that you're having to try to figure out how you place them in a status so you can put them under long-term care.

Just to give you a couple of examples. If you take Three Mile Island, they are in the process of dismantling that reactor there and they're shipping it across country to be examined. They found that the cost of dealing with what they're having to do at Three Mile Island are substantially higher as they begin to move that particular facility out of commission. I think the numbers Mr. Fultz was telling me the other day is—

Mr. FULTZ. Well, when they initially started to clean up that reactor, they were thinking in terms of around \$150 to \$200 million. Today, the most recent figures would indicate that it's over a billion and could cost more. So the estimates in this area, as Mr. Peach has said, are not very clean at all.

Chairman GLENN. Well, the point I wanted to make was that these figures that we're talking about here are what you would see now, I presume, as the minimum figures just to really get going on cleanup. It would not be the total estimate if we were to say we were going to return the whole complex to green field status as we shut these facilities down.

Mr. PEACH. Yes. And if you deal with a nuclear reactor—I mean NRC has run through—the information we've seen—they come up with estimates saying the cost of decommissioning a nuclear reactor can be anywhere from down in the hundreds of millions, low hundreds of millions up to several billion.

Chairman GLENN. OK. You addressed the 2010 Report. Would you address the Needs Report in the same way? DOE's December 1988 ES&H Needs Report contains cost estimates that differ from those in GAO's July 1988 \$100 billion report. What are the differences?

Mr. PEACH. Again, we have, if you would, Appendix 2 to my testimony, which is on page 16, includes a reconciliation of that. If you remember the total range, we had a range in our report of \$115 to \$155 billion, including modernization and environmental problems. They had a range in that report of \$53.4 to \$91.6 as additional costs. The essential difference there is that they didn't include modernization costs in that plan. They only included the kind of costs necessary to upgrade some of their existing capabilities to meet safety requirements. So if you look at the modernization costs, you find a number of \$35 to \$45 billion in our report and only \$6.5 to \$13.4 billion in their study.

Again, if you look at the disposal of radioactive waste, we reflected what is the total cost of the radioactive waste disposal program.

In their study, they did not include the waste fees they would have to pay to store waste in the repository to be constructed or their interim storage activities.

Decontamination, again, there is a difference there of \$15 billion; again, in our report \$2.5 to \$4.3 billion. Again, they are only talking about the facilities which are presently designated as inactive. You notice the environmental restoration cost is pretty much the same range, \$35 to \$65 billion, and \$34.6 to \$63 billion; essentially, a comparable estimate at that time on environmental restoration.

Chairman GLENN. How much were you able to do independently on this as far as making your assessments, as opposed to being pretty much dependent on figures you got from DOE?

Mr. PEACH. We're very dependent on figures we got from DOE. That's one of the reasons that you can take, and we can run a reconciliation between what we had come up with in our study and how we thought—as we saw it, the proper way to account for giving you an overview of what the total cost was going to be of dealing with this problem, and we can reconcile that fairly easily to the kind of figures they come up with now because the base is somewhat the same.

Chairman GLENN. On the Needs Report, too, as I understand it, what they came up with does not include the nuclear Navy program for naval reactors. Is that correct?

Mr. PEACH. That would be my understanding. That's right.

Chairman GLENN. And it does not address off-site contamination problems, as I understand it; just what is happening on site. Is that correct?

Mr. PEACH. That is correct.

Chairman GLENN. Now, that could be a big kicker that we haven't even dealt with yet because we know that some of the problems are off site.

Mr. PEACH. Right.

Chairman GLENN. And it does not cover decommissioning and decontamination of all facilities. That can be another big one.

Mr. PEACH. Yes. We see that as being potentially a very large cost area.

Chairman GLENN. Have you made any estimates in those three areas of naval nuclear reactors, off-site contamination and decommissioning and decontamination?

Mr. PEACH. The only one is in the decommissioning and decontamination, but I still would view our estimate there as being, really, a very tentative and preliminary kind of estimate because we just recognize there are tremendous uncertainties in that area.

Chairman GLENN. Yes. Just one additional question before I move on. Your cost estimates and DOE's both assume no change in ES&H standards for the future. And the history of environmental regulation is that the costs have gone continually up as the people of our country have become more and more aware of problems, and we have reflected those concerns in setting up programs to deal with them.

If we set up an historical advance of costs of dealing with environmental problems, have you factored that in at all and tried to make any estimates?

Mr. PEACH. We have not factored that in, Mr. Chairman. What we have tried to recognize are two things here. We still think they're in the process of defining the scope of the environmental problems they're going to have to deal with, so there are unknowns.

As I highlighted in my statement, they have not completed their safety policy and the implementing approaches that they are going to have for their major nuclear facilities. I think, once they complete that, you can expect there are probably going to be further things that they will determine have to be done. So there are a lot of things here that could point to higher costs than what we are looking at.

Chairman GLENN. My 10 minutes is up. Do you have any opening statement, Senator Roth?

OPENING STATEMENT OF SENATOR ROTH

Senator ROTH. Yes, I do, Mr. Chairman. I regret that I'm here late but as you know, as usual, we have three committee hearings at the same time.

But like you, I am deeply concerned about the problems surrounding the Department of Energy's nuclear facilities. DOE has prepared a detailed report on their plans to deal with the challenges of waste cleanup and plant modernization. I think that these hearings that you are holding, Mr. Chairman, do provide an excellent forum for the discussion of these ideas.

I will not read my entire statement but I would ask that it be included in the record. But again, Mr. Chairman, I want to applaud you for your long-time commitment and leadership in this most important matter.

Chairman GLENN. Thank you very much. Without objection, the entire statement will be included in the record.

[The statement referred to follows:]

STATEMENT OF SENATOR ROTH

Thank you, Mr. Chairman. I too, am deeply concerned about the problems surrounding the Department of Energy's nuclear facilities. DOE has prepared a detailed report on their plans to deal with the challenges of waste clean-up and plant modernization, and these hearings should provide an excellent forum for the discussion of these ideas.

The Nation's nuclear weapons complex has been operating, in essence, since the days of the Manhattan project in the 1940's. Over that time, a great deal of radioactive waste has been accumulating at various DOE sites. I want to emphasize that the health and safety of the people who work in and live near these facilities is of paramount importance. Dealing with environmental and health hazards should be at the forefront of our agendas. You can be assured that this committee will maintain a keen watch of all clean-up efforts.

As toxic and radioactive debris has been building up over time at DOE's nuclear facilities, the production plants themselves have been wearing down. Of the 14 nuclear reactors under DOE oversight, only three are still operable. But due to a series of mechanical and management problems, those three reactors have not produced any tritium since last April—tritium, as we know, is absolutely vital to our nuclear deterrent. I have always been committed to the readiness of our national defense, so I look forward to hearing of DOE's plans to safely meet the future requirements of our nuclear arsenal.

Balancing plant modernization and waste clean-up is no easy task and will obviously require hard choices of funding priority. Toward the end of last year, the problems of the Nation's nuclear weapons plants received a great deal of attention in the media. This followed long-standing attention to this issue by Congress. It is my

hope, Mr. Chairman, that these hearings will provide some direction toward solutions to these problems.

Finally, Mr. Chairman, I applaud your long-standing commitment to the safe and effective operation of our Nation's nuclear facilities. Your persistent vigilance over this matter has produced positive results in the past. I look forward to this set of hearings and working with you on this issue.

Chairman GLENN. Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman.

Mr. Peach, in the couple of weeks that I've been here as a Senator, I've now had the opportunity to hear you twice. I must say that each time my respect for your experience and the work that you've done and your independence grows. I want to take the opportunity to ask the kinds of questions that a newcomer can ask about the past, hoping that they may enable all of us to avoid repeating some of those mistakes in this and other areas.

In that sense, I would like to ask you a very general question. I understand you're not going to be able to give a detailed answer, but the general question is how did we get into this mess, from your review of the facts here? Was it carelessness? Was it a lack of adequate personnel? Was it an intentional coverup?

Mr. PEACH. I have used two words to characterize what has happened and to try to provide a frame of reference. You've got to remember, we are dealing with facilities that were constructed largely in the fifties in many cases for many of the major components when we started a nuclear weapons program that have not undergone all that much of a major upgrade or change. There are many that would view it, in many aspects, still operating the way that we did in the fifties and sixties. The two words that I've used most to describe it have been complacency and neglect.

I think that they got complacent about safety. The Department of Energy had an attitude for years that it could, in effect, self-regulate itself; it didn't need anybody looking over its shoulder, providing advice as to whether everything was being done in the best manner. That's not the approach that we decided to apply to the commercial nuclear sector.

With that self-regulation so that essentially the same people responsible for production were responsible for safety oversight fully, without any independent look, I think that over time you get comfortable with activities. In this case, the activity is a nuclear operation which can be highly dangerous and requires careful attention to safety at all times. But I think, over time, you just got complacent and didn't do the things that needed to be done.

You can find evidence of that in looking at the Savannah River situation because when we find these two most recent incidents—we talk about the August incident and the incident that was described in the paper this morning—what you find is an incident that can be described correctly as saying, "Well, it really wasn't a serious situation as it occurred," but you really don't know that until after-the-fact analysis. Because what you have is reactor operators being confronted with an unusual situation or event, needing to stop and analyze what happened and not stopping and analyzing what happened, but continuing to charge ahead and do additional activities that create what could be, under other circumstances, a dangerous situation.

It shows that the reactor operators don't have a good understanding of that reactor and how it's operating. They don't have the right kind of training, the right kind of procedures and the right kind of mind set about how they deal with something.

If you look back, there's been another document produced showing that they have had some—I forget the number—30 or so incidents, going back into the 1950's at the Savannah River reactor before. There's a real parallel, if you look at those incidents. They looked back and thought out what caused them—it was lack of good training, lack of good standards, lack of good procedures, but here in 1988 they still didn't have them.

The other side of it—that's the complacency side—the other side is the neglect side. When they started in the environmental area, although they've moved some better procedures in recent years, originally, it was almost, in some instances, as Senator Glenn referred to, digging an open pit out back and putting the waste in it. So we have literally hundreds of waste sites, they're trying to identify, located across these facilities that are a result of that neglect.

The Federal Government is no different than many areas in the private sector. It has not been a good steward in the environmental area in terms of how it has dealt with hazardous waste, and these are hazardous wastes.

Mr. FULTZ. If I could answer, I also think that there was a reluctance on the Department of Energy's part to really want to admit that the problems are as serious as we know they are today. I'm not sure that's a coverup but it certainly was a reluctance.

Senator LIEBERMAN. Is it your sense that there was some awareness? I think what Mr. Peach said is probably true, human nature being what it is. People will focus on production, as occurred here, and will do what is easier and less costly in the short range, although the long-range consequences may be very harmful, to the environment and costly to the Government.

Is it your sense that that attitude within DOE has changed? The recent incident that you referred to suggests that there may still be some complacency, or at least not the right mind set, at the lower levels of DOE. Do you sense that this has changed at the higher levels of DOE?

Mr. PEACH. I think we saw a change, at least in my sense, in some of the kinds of actions Secretary Harrington took over the last several years to begin to try to bring about that kind of change. But it is a kind of change that has to permeate down through the organization, down to those reactor operators. It has to permeate down to the operations office level at DOE, the people co-located at those major site locations, in terms of the kind of day-to-day oversight they're providing.

It needs to reflect an acceptance by the Department of this environmental, health and safety inside, independent look to help better understand problems, on-site inspectors and people, and the managers using them effectively to help them do their job better of overseeing that operation, and making sure the contractor is operating in an appropriate manner. That change is not going to be something that's easy to accomplish.

They are going to be changing a contractor at Savannah River, they're going to be going from Dupont to Westinghouse. But in that

changeover, that means only a certain number—maybe less than a 100—management personnel come in. All the other employees stay the same. So even there, if you want to try to change that mind set down to the operator level and make sure everybody has got the message about where safety comes into the equation, it takes some effort.

Senator LIEBERMAN. What would you advise DOE to do now to carry out that aim, to make sure that the right attitude about safety does permeate down to the people who are on the front lines?

Mr. PEACH. Well, I think they just need to make sure that they maintain a balance between environment, safety and the concern that will still continue to be there about production. I think they need, as we've outlined in our statement, having this environment, health and safety resident inspectors at major facilities is a good approach. It gives you an independent look down there within the department.

I think, as Senator Glenn mentioned, having these environment, health, and safety resident inspectors, having this independent Safety Board, looking at DOE and saying overall, "How are the programs working? How are they being carried out? How is the resident inspector program working?" I think those kinds of things are needed, being done by people who are well, technically, qualified to do that.

Senator LIEBERMAN. Last week when you were here, we talked more generally about the Office of Management and Budget. Today we've heard about complacency and neglect within the Department of Energy. In your review of the history of this situation, do you find any indication that anyone outside of the Department of Energy had any concern about how this program was being carried out, particularly from within OMB?

Mr. PEACH. I'm not sure, until recently, I saw any evidence of a high level of concern. I think they're now aware of the size and the scope of the problem, the way it's being talked about. There are two observations I'd make that I think are relevant. If you look—and this is the number that comes out of the DOE 2010 plan and I picked it up from reading that—they talk about the fact of the expenditures spent to keep these facilities up to date, modernized.

They talk about the investment being in the range of about 2 percent on average since those facilities were put together; and they say normal industrial type complex, you would be talking a 4 to 7 percent of investment that you would be having to make to keep your facilities up to date. I think that probably tells you of an unwillingness to be able to expend the amounts of money that needed to be expended to keep this kind of program up to date and going. Historically, it raises a question about, in the realities of today's situation, being willing to spend the money over the next 20 years to do what needs to be done now.

Senator LIEBERMAN. Right. How about the Defense Nuclear Facilities Safety Board? Are you satisfied that that now puts in place an adequate structure for oversight of DOE activities in this area, or does it need improvement?

Mr. PEACH. Well, the one area that we suggested that it needed to be improved is that the openness and ability to look at all the

facilities should be there, and there were certain activities under the weapons complex that were excluded. That included specifically the Pantex facility and the Nevada Test Site facility. We're not quite sure we understand the rationale for that.

Senator LIEBERMAN. I was just going to ask, were those excluded for security reasons above and beyond the other facilities? Do you have any idea why they were excluded?

Mr. PEACH. Maybe the supposition is they're too far downstream in terms of the weapons program. In other words, you're moving more towards the—

Senator LIEBERMAN. The actual construction.

Mr. PEACH. The final putting together and testing and maybe that's a determination. But, obviously, with testing and other kinds of activities, there are environmental and other kinds of concerns that can arise there.

Senator LIEBERMAN. Thank you. My time is up.

Chairman GLENN. Yes, Pantex is where the final assembly occurs and the Nevada Test Site, of course, is where they actually set some of these things off to see the actual results of their work. Paducah and Portsmouth were left out. Those are basically enrichment plants, and that gives a measure of what our capability is, too.

I think there are security concerns, but I never bought the security concerns because we have thousands upon thousands of people working there. And to think that we can't come in with a few people to help oversee that things are being done safely was one I thought was wrong. We didn't like that. That was knocked out in conference with the House last year as part of that bill. I thought it was a deficiency and we will probably readdress that this year.

Mr. FULZ. I think it's interesting that Pantex was one of the facilities that appeared very, very high on the September assessment report—one of the reports you referred to earlier. In fact, I believe it was in certain categories where the highest priorities which the Department had identified as posing a threat to public health.

Chairman GLENN. Senator Kohl.

Senator KOHL. Mr. Peach, I'd like to ask you, in terms of the cost of this cleanup and stretching it out over 20 years, is it divided 20 into \$100 billion or is there a different kind of a cost estimate that you place on this in terms of how it starts, starts and stops?

Mr. PEACH. Well, if you, as I understand it, taking a look here at the Department of Energy budget figures for this year, and if you look at what they had requested for their defense activities in 1989, and you look at the increase there, particularly in areas dealing with environment, safety, health and modernization for 1990, the increase is only about \$725 million. So they, basically, are looking at spending \$725 million more for environmental, safety, facilities, modernization activities in 1990 than they spent in 1989.

Of course, they, in their own report, say that the incremental costs of dealing with those areas above what they were spending in 1989 is \$81 billion. So I'm saying you've got a \$725 million figure next year against an \$81 billion cost over 20 years. Obviously, if you're looking at spending up to \$81 billion over 20 years, you're looking at a ramping up of cost sometime in the future. You're going to be looking at higher costs that you will have to have in

the budget if you're going to deal with those kinds of numbers. When you begin to build major new facilities or when you begin to move out on major environmental cleanup efforts, you'll be looking at substantially higher costs annually.

Senator KOHL. So the number they have in is not an accurate number?

Mr. PEACH. Well, it's their budget number for the next year.

Senator KOHL. Right.

Mr. PEACH. And to some extent, it may be—we haven't examined that fully—what they feel they can effectively spend next year. Because, if you go into constructing some of these major new facilities, you have to begin with the planning, the designing before you move on to major construction where you will have even higher costs to be incurred. And in the environmental area, I think that there's just a whole host of things that they need to do there to try to understand the scope of the problem to decide what they're going to do in the way of cleanup—lot of definition.

Senator KOHL. Why do we have that 20-year number? Is it just because of the amount of dollars that they assume will be available?

Mr. PEACH. Well, it goes back to—I think the 20-year number, in one degree it represents a long-term plan for what they think and see they can do, what needs to be done over the next 20 years and also what they think they can do.

I break that 20-year plan down into two parts. It has \$81 billion over 20 years. \$52 billion is for modernization. the modernization part is much more complete in terms of what facilities they say they need. They even include a schedule in the plan that shows when they will start to be constructed and when they will be completed. But it doesn't give you figures year by year of how much you would expect to expend, but they expect it to be \$52 billion in 1990 dollars over 20 years.

On the environmental side, it's much less incomplete numbers. It's an estimate of virtually \$29 billion, and it essentially represents the amount of money that they're willing to spend in that area through the year 2010. There's not as much definition of what they're going to do, when they're going to do it, how they're going to approach it and much more uncertainty about the cost estimate.

Senator KOHL. OK. Are you satisfied that in terms of management of this problem, that we're moving in the right direction, that we will find ourselves properly staffed and managed to see to it that what needs to be done is going to get done?

Mr. PEACH. I think we're moving in the right direction. I mean I think there's been a lot of progress that has been made. If you look at it—I made a little list here for myself in terms of the 20-year plan when I was looking at it which somewhat relates to this, and it's sort of like "What does the 2010 plan do?" OK.

I think this is an important step. It admits there is a problem. It says they're old facilities. There have been evolving standards and they hadn't kept up to date on those. There's been low infrastructure replacement investment over the years. It says there's been an emphasis on production as related to safety and environmental concerns. That's a big step forward. And it provides a modernization plan that you can ask questions about but it's reasonably com-

plete, at least in terms of facilities they're proposing and major upgrades they're proposing.

What it doesn't do, I sense it doesn't fully account for the cost. It does not have nearly as complete a flushing out on the environmental side of what needs to be done and how they're going to approach it. And I think the cost growth potential is fairly great but not discussed very much, even on the modernization side and in some of the other areas like decommissioning and decontamination.

I say all that against a backdrop that we've got to remember in any of these plans, we're looking at figures that are not budget quality. They're very early, they're very preliminary, but they do give you an idea of the enormity of the problem you're facing.

Senator KOHL. If you had two or three recommendations to make to get us from here to there in the most effective way, the most economical way and environmentally-sound way, any effective management recommendations, what would you say?

Mr. PEACH. I think that I would look at—well, one, I would want to recommend that they continue to staff and move forward on their resident inspector program. That would be one thing. Number two, I would think at least that they would want to look at how they will be budgeting and accounting for and managing the environmental cleanup and whether they should have, in a management sense, some separation there in terms of defining the responsibility for that environmental cleanup, the budget, the accountability.

If you look at the size of that problem and you look at what has to be done there, they've got to do things like define the universe of the problem. They've got to deal with how they come into compliance with standards that they are not now in compliance with on the waste they're now generating today. They've got to deal with a number of sites where there've been contamination over years that now need to be cleaned up.

They've got to set some kind of criteria for how they decide how much is going to be considered clean, what kind of cleanup they're going to do, reach agreement with the states and with EPA probably in some of the facilities on the approach to cleanup, and then begin to set some time tables and priorities for that.

I would submit that that is every much as big a challenge ahead as is the modernization problem. They are both big problems—managing the modernization problem and managing the environmental problem, and it's going to need some very close, careful, full time attention, just as much as the modernization side.

Senator KOHL. Thank you, Mr. Chairman.

Chairman GLENN. Thank you, Senator Kohl.

Senator ROTH.

Senator ROTH. As I understand your comments, one of your real concerns is complacency. I suspect that's correct. What bothers me is how do we correct that? What can we do to prevent this situation from arising again because it seems no matter what kind of a structure you build—and I was a supporter of the initiative by the Chairman—down the road, complacency begins to come back into the picture. What can we do to try to prevent that from happening long term?

Mr. PEACH. I don't know any way other than to suggest that you try to design a system that has—and we have a frame of reference in the General Accounting Office; you may have heard the Comptroller General use it in other things—of a system that has the right kind of internal controls in it. And internal controls don't have to relate to just financial activities. They can also relate to management activities. You have some kind of check and balance.

You have to remember, this was a system that operated, as I see it, without any checks and balances for years. The same people responsible for production were responsible for safety. Now, you still will have that under any system. You're going to have to have managers down at the site, and they're your first line of defense to assure that you also are running a safe operation.

But you begin to build in some checks and balances in an area like this, like having resident inspectors there that are not reporting to the production people but are reporting to the environment, health and safety people. So you have people doing that and above that, you have this independent board that represents an outside body outside DOE that is examining and has the capability, with good technical qualifications, to see whether all the control systems within DOE are working well and if some problem does come up, to investigate it and determine what needs to be done better. The kind of things we've been trying to suggest are things that would build in those checks and those balances and those internal controls.

Senator ROTH. Let me go back to one statement of yours. I'm not sure I correctly understood you. It seems to me that it's critically important that basic responsibility for safety has to be in the hands of those operating the facility, that you cannot divide production from safety; that you do have to have some kind of a structure that gives an independent check and recommendation to ensure that safety measures are being not only adopted but followed through.

But it would be a very serious mistake, it seems to me, from the point of view of responsibility, to not hold the operator, the management or whoever that may be, responsible for not only the production but the safe production of the weapons. Would you disagree with that?

Mr. PEACH. No, I do not disagree. I think that is your first line of defense, and your hope is to build in the kind of safety culture in those managers, those operators that assures that that happens. But if you look at even the more recent history and you look at the reactor operator down there, you find that they really don't have the right kind of training and understanding. They don't have the right kind of procedures in place as to how to react to situations. You find the kind of standards that DOE had and should be assuring were in place for the contractor weren't there. So you begin also to try to build in the kind of systems that make sure those kind of things happen.

Senator ROTH. I agree very much with what you've been saying, that it's important that the individual worker be safety conscious and apply very strictly the safety rules and regulations.

Going back to responsibility, there's no question in my mind that it's desirable to have independent review and critique. What do you do where you have a conflict between—and an honest conflict be-

tween those responsible for operating the facility and those who are looking at it from a safety point of view only?

Mr. PEACH. I think, ultimately, there's got to be the right level of management official that has to resolve that conflict being presented with all the information. That may be, in this case, the Secretary of Energy, if you have an Assistant Secretary for Environment, Health and Safety and an Assistant Secretary for Defense programs, for example. That may be something that ultimately would have to, if they couldn't work out or resolve the problem, that the Secretary would have to resolve it.

I think that the issue—when you give me an opportunity to say, Senator, may be an issue that we do have to look at or we'll find that we will have to confront or has to be confronted as we deal with the safety problems that have been described at Savannah River. Ultimately, the production need imperative will probably come when DOE does some restarting of those reactors. We have to look at where do we stand in dealing with the safety problems; what's the production imperative; how do we balance those things off; how do we best assure ourselves we're operating in the best way if we need to move forward.

Senator ROTH. Would an Energy Secretary be able to make that kind of decision?

Mr. PEACH. I think the Energy Secretary would be the person who would have the responsibility to do it. Even when you look at this outside review board, I think the way that is laid out is that they would make their reviews, they would make their recommendations. That information would be public and the Secretary would have to respond as to the actions taken, but that it could include deciding not to act and being clear on the reasons they decided he did not or could not act on that.

Senator ROTH. At the Savannah River plant, the Department of Energy is focusing its efforts on restarting the K-Reactor. Do you see this as the proper approach?

Mr. PEACH. Keith, you had some comments?

Mr. FULTZ. Well, they are considering the K-Reactor as well as two other reactors. At this point in time, those three reactors are the only reactors within the Department of Energy's complex that have the capability of producing weapons-grade material. It's really the only choice they have at this point with what they have in their current structure as to whether K is more prudent to do than L, perhaps. I don't know. But they are considering eventually starting all three of those reactors at a certain power level over the course of the next year or so.

Senator ROTH. Perhaps this was covered before I came in, but you testified that the cost of building new production reactors could be much higher than DOE's estimate of \$6.6 billion for the two reactors. What would be your estimate of the cost of these reactors?

Mr. FULTZ. Current information from the commercial sector, which is where the only reactors that have been produced recently—and those have been several years ago. We've really not had any new production reactors come on line for a long period of time, so the information is somewhat outdated. But the estimates of cost for those reactors were around \$3.6 up to \$4.5 billion each.

Some of our information, sir, is based on previous estimates and cost overruns within the Department of Energy's various other components or facilities which they have constructed over the years. It's not uncommon to have that overrun by as much as 200, 300 percent from what DOE originally thought it was going to cost. I think the estimate of \$6.6 in 10 years, as stated in the modernization plan, is extremely optimistic, and I think somewhat low.

Senator ROTH. That's all I have, Mr. Chairman.

Chairman GLENN. Good. Thank you, Senator Roth.

I want to be very fair about this. Along with being critical of DOE, which I've been in the past, obviously, I think some of the questioning this morning about how we got into this mess and making sure that we don't perpetuate it into the future is worth a little side comment.

I think we need to remember sometimes that we're all part and party of this whole cold war mentality back through the years. This was for real. Gorbachev hadn't come on the scene yet. A lot of these things occurred and the emphasis on production occurred when I and most other people were just as concerned about that production as anyone could possibly be. We're talking about the Berlin Blockade, and days when we really thought the Soviets might have a chance of a first strike if we didn't produce this material. They might be able to take over in one fell swoop. It was that kind of mentality that drove this.

Now, with all of our 20/20 hindsight, we see that need not have been done at the expense of all these other things. We can't let that happen again. That's the reason we need this outside advisory board and some protections. But we were operating all through these years at a time of Soviet expansionism around the world that had us very much concerned. I think we need to remember that these plants were being pushed unmercifully to produce and had to keep us ahead or dire portent was right behind. That was the kind of mentality we had during that time period.

Now that, to me, doesn't excuse everything that has happened but I think everyone has been sensitized much more to what the situation is now, and that it was a mistake to keep all of the safety and health matters secret through the years.

Mr. PEACH. Mr. Chairman, if I might add one other balancing comment to this, too, is certainly in the environmental arena—and that's one of the other hats that I wear at GAO—we've done a lot of work on how the Federal Government has dealt with that problem. DOE is not the only agency that exhibits problems in how effectively it's dealt with environmental contamination it was causing over the years. We found that throughout other Government agencies and, in many cases, found the Government has been somewhat worse than the private sector in what it has done in some of these areas.

Chairman GLENN. And in all fairness, some of the people at DOE now are catching the fury for a lot of things that happened back through the years that they weren't personally responsible for. Maybe they should have foreseen and should have insisted that we not just turn over the operation of these plants quite so completely and without closer supervision of private contractors who were making the things go.

To summarize some of this—because we do have to move along here—in the 2010 report reference is made to the total cost, the total cost of running, modernizing, cleaning up the weapons complex, and that figure is cited at \$244 billion. First, would you explain the difference between that figure and 2010's other estimate of \$81 billion, and then we will get on to some other things.

Mr. PEACH. All right. I think the figure that you're referring to, Mr. Chairman, they do have a chart in there that shows the total cost, and that represents the cost of what they are presently spending for the operation of the complex, annualized over the next 20 years, plus the incremental additional cost of \$81 billion that they would see themselves spending as a result of this 2010 modernization plan.

Chairman GLENN. That would be a total to get to \$244 billion, then. We could figure, then, if you take that out and say it's a 30-year average—I was just looking at the figures here—if you say it's going to be a 30-year program and \$244 billion for the total cost, as we see it right now, this would be somewhere around \$8 to \$10 billion a year that we should be spending, on the average.

Mr. PEACH. Well, I look at it differently. This is the total cost they expect to expend for the defense program's funding over this next 20-years.

Chairman GLENN. All right. Now that's a 20-year figure.

Mr. PEACH. So if they were going to expend that for 20 years, you would be looking at about \$12 billion a year, which is less than—

Chairman GLENN. All right. So I was lumping it out to 30, but that's actually a 20-year figure; so if we went to 30 we would need to add more to that?

Mr. PEACH. Yes.

Chairman GLENN. So we're talking \$11, \$12 billion a year, on the average, to do what has to be done.

Mr. PEACH. If you just look at that in terms of what those numbers are. They sort of reflect somewhere in their plan, as I said, that the numbers we're giving you don't necessarily reflect what we may get in the budget in future years. It reflects what we think we need.

We have had reports recently we might be able to get a cheaper production of tritium through the use of a linear accelerator. The New York Times had a lengthy article on Monday of this week about it, and there've been some other writing about it also.

Chairman GLENN. Do you know enough now to say what percent of our tritium needs we could possibly get from P, K and L back on line, say at reduced power, which might mean we would not need two or three reactors, or two reactors at least? Can we do some of this with P, K and L, as you see it now, and maybe one reactor, and could that be an accelerator—linear accelerator, as writing has indicated?

Mr. PEACH. Well, let me just make a general comment. If you get too specific in numbers in this area, I'm fearful about getting into any kind of classified information.

Chairman GLENN. I understand.

Mr. PEACH. I think that, just as a general comment on this recent disclosure that we've had or expression about possibly being able to use a linear accelerator, I just think there's probably more to know and to understand about that. It's being put forth as an

idea, a different approach. I'm sure it also has costs associated with it and, from my past experience, would say they're kind of issues regarding just exactly what it is, technically, that would need to be done to be able to make this concept work, what bridges would have to be crossed, what's the probability of crossing those bridges.

I also noticed, just from the information I saw in the paper, they're talking about it would take about 800 megawatts of electrical energy to run this type of machine, which gets to be fairly close to the amount of electrical energy produced by one nuclear generating station. So there are issues there that would have to be dealt with as to whether that might be the most effective approach.

Chairman GLENN. Has anyone asked GAO to do a study of that yet so we'll have a little better handle on it?

Mr. PEACH. We did have a contact within the last couple of days from Senator Adams.

Chairman GLENN. All right. We might want to join with him in such a request on that if he's talking to you about that because I think that will come up. It's going to come up when we get into the money that's going to be required to restore tritium production.

Mr. PEACH. I'm sure it will, sir.

Chairman GLENN. How safe are the P, K and L, reactors as you see them now, under their old status with some of the problems they've had? Can they operate safely at a lower level of operation than they've been operating at and still produce tritium of some quantity? There would be a spot below which, I would guess, you couldn't operate them and really do a sufficient job that would produce anything substantial.

Mr. PEACH. I would expect there probably could be. I would hesitate to say too much about that other than it just seems, at this point, that they have a lot of bridges that they have to cross. They are looking at trying to restart one, K, towards the end of this year, but the events of the last few months have brought continued disclosures of new problems not anticipated—the cracks in the pipes, for example, being one; yesterday's problem being another, where it says they have now stopped all activity until they assess what the implications of that is. So there are a lot of bridges to be crossed in what they can do and to restart there.

Chairman GLENN. Thank you. We may have additional questions for you from other members or from our look at the record after we get done. We always appreciate your cooperation in replying to additional questions for the record, and we keep that record open for a few days so that other members can have the advantage of your additional testimony. Thank you very much.

Mr. PEACH. Thank you.

Chairman GLENN. Our second panel this morning is from the Department of Energy, Mr. Troy Wade who is Acting Assistant Secretary, Defense Programs; Peter Brush who is Acting Assistant Secretary for Environment, Safety and Health; Richard Starostecki, Deputy Assistant Secretary for Safety, Health and Quality Assurance; and we originally were scheduled to have Mr. Joe LaGrone, Oak Ridge Operations Office. He had scheduling conflicts and cannot be with us this morning. We have Mr. Bill Bibb of the Oak Ridge Operations Office out of Oak Ridge, Tennessee.

Gentlemen, welcome. We appreciate you being with us this morning. I think most of you have been in the room through the testimony so far, and Mr. Wade, we look forward to your testimony and those of your colleagues this morning. We will wait until you all get seated.

Gentlemen, welcome. You've all been in the room, I think, this morning. You know of our concerns. Most of you have given testimony before here, and before other committees—maybe perhaps more than you like. But we do appreciate your cooperation and we've done a lot of work back and forth with DOE in the last few years. I've been complimentary to Secretary Harrington for being willing to go to the mat and fight the good battle for additional funds, which I think he lost in the final analysis with OMB. We talked about some of those battles with Mr. Darman who will be taking over as Director of Office of Management and Budget in his hearings earlier this week. We appreciate your being here and look forward to your testimony.

Mr. Wade, please proceed.

TESTIMONY OF TROY E. WADE II, ACTING ASSISTANT SECRETARY, DEFENSE PROGRAMS, DEPARTMENT OF ENERGY, ACCOMPANIED BY RICHARD STAROSTECKI, DEPUTY ASSISTANT SECRETARY FOR SAFETY, HEALTH, QUALITY ASSURANCE, AND BILL BIBB, OAK RIDGE OPERATIONS OFFICE

Mr. WADE. Thank you, Mr. Chairman. I would like to submit a detailed statement and summarize that for the record, if I may.¹

Chairman GLENN. The entire statement will be included in the record.

Mr. WADE. Following my brief statements, Mr. Brush will comment, as well.

Chairman GLENN. Fine.

Mr. WADE. The Department has issued several reports in the last 6 months which document the needs of the weapons complex from environment, safety and health needs through facility modernization. In addition, there has been a litany of safety and management concerns; some are valid and some are not.

My detailed submission for the record, Mr. Chairman, addresses all the questions in your communication regarding this hearing. In this summary, I will touch on most and, of course, we will respond to all of your questions.

Before I begin, sir, let me publicly thank you for your support of our programs and for your support on MacNeil/Lehrer the other night. We appreciate your support and your criticism; both have been very helpful to us.

Chairman GLENN. Thank you.

Mr. WADE. Let me first summarize the mission of defense programs. For over 40 years, our statutory mission has been to research, design, develop, test and produce the nuclear warheads that form the nuclear deterrent of this country. We have produced and maintained an effective nuclear deterrent that is the cornerstone of our national security policy. We have done so in continually

¹ See p. 130.

aging facilities that now are not in appropriate condition to be relied upon to last into the next century. Many are, or soon will be, technologically obsolete.

We know what to do better and how to do it. As with any industrial concern, we need to modernize, to bring our facilities up to today's standards so we can more effectively operate within available funding to continue to support the national security needs.

In producing this Nation's nuclear arsenal, however, some very toxic and radioactive substances were generated. A variety of industrial practices were used to handle generated wastes. By today's standards, some of those practices should have been different; for others, the technology or knowledge to handle those substances was just simply not available.

There are a variety of numbers floating in the press, and we've talked about them in this hearing room this morning and in our own reports. Let me, from my vantage point, try and set the record straight. The cost range to bring our defense facilities into compliance with applicable environmental and safety criteria—and that would include restoration, it would include the waste management activities, and it does include the environmental restoration associated with the facilities mentioned for close-down in the modernization report. Anyway, that total number is between \$48 and \$80 billion. That is to achieve full compliance with today's criteria.

The wide range reflects a difference between expected actions; in other words, those consistent with current laws and regulations to complete the cleanup and come into compliance and those that might be necessary should a determination be made to go further, especially for cleanup activities. Those can best be described as the "green field" activities that you talked about earlier.

I do believe our figures and those of the GAO are, indeed, consistent when one looks at similar time frames and categories and similar criteria. As Mr. Peach pointed out, in many cases, we looked at incremental costs—we totaled them as incremental costs in the modernization study while they took all costs, operating as well as the incremental costs, so I believe they are consistent.

The cost to modernize our facilities, consistent with the recommendations included in President Reagan's report, is \$52 billion. This is composed of new production reactors, the Special Isotope Separation Project, facility and site relocation and other initiatives necessary to allow our complex to be responsive and more efficient into the next century.

The budget request before the Congress contains about \$2 billion for environmental cleanup and compliance and radioactive waste management. It contains \$1.3 billion for facility modernization; that's the fiscal year 1990 budget request. Those figures, by the way, are from a table that is on page 7 of my written statement.

Each amount was arrived at through careful balancing of all the things we are required to do and within fiscal guidelines established by Congress and the Administration. Each amount represents the incremental step of an obvious long-term effort to clean up, to come into compliance and to modernize the complex while continuing to perform our statutory duties and supporting national security.

Things are being accomplished. We are completing environment, safety, and health compliance actions. We are negotiating agreements with the States and the EPA. We are moving ahead with the cleanup. We have virtually doubled the appropriations for cleanup this year over the past year. We are requesting a 23-percent increase over 1989 for cleanup and compliance resources. Environmental restoration in the modernization study ramps up from \$315 million in Fiscal 1990 to \$1 billion in 1995, to \$2 billion in 2000. That's far more than level of effort.

As I noted to you in my letter of December 28th, there has been much publicity associated with the extent of the necessary environmental cleanup at DP facilities. Most of the publicity has been critical and little recognition has been given to the environmental accomplishments of the past decade. We have been moving ahead to address those past problems. We have not moved rapidly enough. I believe we're on the right track now, and some of the things that we have accomplished are highlighted in the enclosure to the letter I sent you in December.

Let me now turn briefly to the situation at Savannah River. There, indeed, was an incident at Savannah River over the weekend. There was a test conducted where pipe in the secondary cooling loop of the plant was configured for a reverse flow test. To do that, certain check valves had to be pinned into the open position. That test was conducted and conducted satisfactorily.

The plant was then reconfigured for another test, and one of the check valves apparently was left pinned open when it should have been closed. For the second test, which required pressurizing the secondary cooling system, a pump was started and there was expected to be a pressure increase on the gauges in the control room. That pressure increase was not seen and so a second pump was started. When that second pump was started, there was a water-hammer effect in the secondary cooling system, and there has clearly been damage to the one check valve that had been left in the open position and perhaps to some other piping.

An initial assessment of the event indicates at least the following concerns: Improper response to unusual conditions; inadequate supervisor awareness; inadequate configuration control; inadequate procedures and failure to follow procedures.

We are investigating this incident. It does have some unfortunate parallels to the August incidents when you talk about operator attitude. We are not at all happy with what has happened and we will keep this Committee fully informed of our investigation.

A major task will be to restart the reactors at Savannah River. And although there have been reports to the contrary, there is, as yet, no identification of any fundamental flaw which could cause permanent shutdown. These reactors are old and possess differing technology than those in the commercial sector. The issue, however, is not technology but whether these reactors can be proven to be safe when measured against the standards of the nineties.

Certainly, there will be differences between experts regarding these issues and, hence, public discussion. Hopefully, such discussion will be both productive and valuable to the successful operation of these vital systems until such time as we get new capabilities in place. And, as you mentioned earlier, Mr. Chairman, that is

our concern. The concern is not the start-up of the reactors; the concern is to assure that we are doing what is necessary to operate those reactors for a decade.

We do have improvements to make in management procedures at all of our facilities—not only Savannah River—and in all of our technologies. We are establishing those procedures in a reasoned manner and in a well-thoughtout and independently reviewed process that will evolve this year.

In summary, Mr. Chairman, we have documented the problem. We are moving ahead. Our primary mission, as established by the Congress, is to support the Department of Defense nuclear weapons requirements. We must balance that primary mission against our responsibility to clean up the environment at our facilities. I believe that our budget request reflects a balance of programmatic and environmental priorities as currently established by the Congress and the Administration.

I hope a national debate will focus on the relative priorities of cleanup, national security and the other important issues facing our nation. This will allow us, acting in response to the Congress and the Administration, to move ahead in a constructive manner.

I would now, Mr. Chairman, like to ask Mr. Brush to expand on those points specific to the Environmental Survey, the December Needs Study and then, of course, we will be available for your questions.

Chairman GLENN. Fine. Thank you. Mr. Brush, go ahead.

**TESTIMONY OF PETER BRUSH, ACTING ASSISTANT SECRETARY
FOR ENVIRONMENT, SAFETY, AND HEALTH, DEPARTMENT OF
ENERGY**

Mr. BRUSH. Thank you very much, Mr. Chairman. I will speak very briefly today, in light of the time constraints, about two of the specific reports which have been prepared by the Office of Environment, Safety, and Health within the Department of Energy. These are the Department's prioritization report and secondly, the December report on environment, safety, and health needs.

Mr. Chairman, since 1985, the Department has been working to resolve two significant problems. First, that the magnitude of our environmental and safety problems have not been systematically identified; and second, that the potential resource needs and priorities to resolve these were unknown. Two studies were, therefore, initiated to estimate the resources needed for environment, safety, and health corrective actions required at operating facilities and cleanup activities necessary to remedy environmental contamination.

The first of these was the environmental survey. The purpose of the survey is to rank the environmental problems and areas of environmental risk at DOE operating facilities. The survey is a management tool to be used for long-range planning and to assist in better allocating our resources. It will also serve to establish a baseline of environmental information about each facility for use in the environmental audit program which is currently being developed.

The survey, Mr. Chairman, is not complete. When it is complete, it will be a 3-year, \$60 million program covering all 35 major DOE sites. A report entitled "Environmental Survey, Preliminary Summary Report of the Defense Production Facilities" was issued in December. This report provides a ranking of major findings from the Survey at the 16 defense-related facilities only. The final summary report covering all 35 sites is planned for issuance at the end of 1989.

Turning now to the environmental needs study. In June of 1987, during a hearing before you, Mr. Chairman, former Under Secretary Joseph Salgado agreed to provide you with a report addressing the environment, safety and health needs of DOE defense-related facilities. That report was issued on July 1, 1988.

But even before the issuance of that report on the defense complex, the Department notified your Committee that DOE would expand this analysis to include all departmental facilities. This latter report was completed in December 1988, and it updates the July report on the defense complex and expands the scope of the study to cover the management of radioactive waste as well as decontamination and decommissioning of inactive facilities. Preparation of both the July and December reports was based on facility, environment, safety and health long-range plans, prepared as part of our planning process that began back in 1985.

The December report summarized the activities and resources needed for 45 DOE facilities and certain other special programs to comply with environmental and safety requirements and to meet DOE objectives. The report estimates the dollars required for routine day-to-day activities which will ensure that DOE operations are safe and environmentally sound. The average will be about \$1.8 billion per year.

In addition to that, Mr. Chairman, we estimate between \$53 billion and \$92 billion will be needed to address environmental and safety corrective actions, environmental restoration and waste management projects. I would note here that when you add those numbers together, and particularly the \$1.8 billion per year, that the numbers do exceed \$100 billion, as was noted earlier by the GAO.

Mr. Chairman, the Department of Energy's environment, safety, and health programs are in transition. As you said in your opening statement, we have made a start. We have compiled a baseline of environmental problems and risks. We have ranked the major environmental problems. We have estimated the resources that will be required to address them. We look forward to working closely with the Congress, with EPA and with State agencies to solve these environmental and safety problems.

I would be happy to answer your questions. Thank you very much.

Chairman GLENN. Thank you.

Mr. Starostecki, do you have any comments?

Mr. STAROSTECKI. No, sir.

Chairman GLENN. Mr. Bibb?

Mr. BIBB. No, sir.

Chairman GLENN. Good. Thank you, gentlemen.

Back to the incident that occurred on Sunday. I'm glad you addressed that, Mr. Wade. I'm concerned in a couple of areas, though. Because after we had the previous incidents last summer, one of the things that DOE was going to do immediately at that time was make sure that if there was any doubt about anything, the plant got shut down until we determined what the situation was. Here we've gone beyond that again.

What management changes did you mandate last summer that would prevent a repeat of last summer, and what violations of your orders occurred this time?

Mr. WADE. Certainly, the incidents in the P-Reactor start-up last August were caused by a multiplicity of things, inadequate procedures, and certainly what I will call an attitudinal problem. That is, that when an event was off normal in the machine, other actions were taken before one truly understood what the conditions were in the machine.

It's a little early to say, Mr. Chairman, because I do not have detailed data on precisely the order of events that happened in this incident with the secondary cooling loop. But from the information we do have, it would appear that once again we had a reactor system in an off-normal condition, and other things were done before the plant was stabilized.

I do not, at this point, know whether those were procedural violations or simply errors in judgment. There is no question that they are serious and there is no question that what we have attempted to accomplish between the events last August and now isn't working as well as it should be.

Chairman GLENN. Mr. Smith, Bob Smith, is your DOE site representative down there for environment, safety and health; correct?

Mr. WADE. That's correct. He is Mr. Brush's representative on site. Yes.

Chairman GLENN. Now, it was my understanding that when this incident occurred, that the people doing the operating at that time didn't even take it to be of sufficient concern to notify him; that he learned about it by overhearing another conversation on Tuesday. Is that correct?

Mr. BRUSH. In partial answer to your question, Mr. Smith is, of course, one of three resident EH site officials down there. We are sending, in addition, to the site two senior EH safety officials to work with the team that is investigating this. One of the most important questions that we're going to look at is the problem of communication that apparently still exists. We do not have details on exactly who was told what, at which moment. We need to find those things out.

Chairman GLENN. That's pretty elementary, it seems, as to when he found out about it. Don't we know the answer to the question now, without a big investigation?

Mr. STAROSTECKI. Neither Bob Smith nor, really, was the Department of Energy, the line management, notified in a timely fashion.

Chairman GLENN. Neither Mr. Smith nor the Department was notified and knew about it fully until Tuesday, and it happened on Sunday; is that correct?

Mr. BRUSH. That is correct.

Chairman GLENN. OK. Well, that does not follow out what we thought was going to be the results of last summer when we went through all this again. I've got a great sense of *deja vu* here; we just have a different incident with the same kind of approach being taken to it by the people down there running the operation. We've been lucky too many times and our luck is liable to run out one of these days—not necessarily on a secondary cooling loop like this, which I understand it was; is that correct?

Mr. WADE. Yes. The nuclear system was not involved at all. But nonetheless—

Chairman GLENN. It's that kind of complacency, it's like the people that you very properly sent down there before to look into the previous incident. Some of those people who were experienced reactor operators themselves came back using words, which they testified before us on—words like they were "appalled" at the attitude, at the "cavalier attitude." Those are two words I just happen to remember. They used some others that were equally strong at that time, as you remember, too. And now we find the same appalling, cavalier attitude again. What are you going to do about it?

Mr. WADE. Well, I wish I could give you the answer to that. We are going through several transitions down there. One of the things we attempted to do after the August incident was to add another complete reactor crew to the Savannah River complex so that we would have five full crew complements, so that one could always be in training, so we could perhaps prevent some of these kind of things from happening. That clearly hasn't helped as we thought it would.

I do know that very early on in this incident, there was a great deal—while there were clearly violations in the control room and, as I said earlier, I don't know if they were procedural violations or just bad judgment, the extent of the damage, quote, unquote, was unknown. How many valves were damaged, if any, and how much of the pipe was damaged. That is what they tell us contributed to the delay in reporting it. That is an unacceptable answer.

Chairman GLENN. I'm concerned about this in a couple of areas. The first, of course, is that we've had the crews down there operating the plant under one direction for some 35 years. They're going to shift over now but Westinghouse, as the new manager coming in, is still going to use most of those same people. Now there will be some changes, of course, obviously management changes, but the hands-on people doing the day-in, day-out running will basically be the same people. Is that correct?

Mr. WADE. That's correct. There will be something less than 40 people changed. There will be 11,000 carried over.

Chairman GLENN. That's a pretty big preponderance of the old crew. I don't know how fast they can be sensitized to the fact that new management and new procedures are in order. But that's going to be your major task and we will be wanting to check with you from time to time on that, I'm sure. You know, we've just been lucky through the years.

Mr. WADE. We agree, sir.

Chairman GLENN. We have, just to recall a different figure of forced shutdowns, I think in the average civilian plant, nuclear electrical generating plant, they average somewhere three to six

shutdowns a year. At Savannah River, we've doubled that. Through the years, it's been 9 to 12, as I recall the figure, forced shutdowns. So it indicates, certainly, a lack of the same kind of careful running of the plant that we have in the civilian area.

A second area of concern, how much does this set back our restart schedule for the K-Reactor? Do we have a feel for that yet?

Mr. WADE. We were looking at a March report coming from Westinghouse, Dupont, which would tell us when we would be able to restart. As I mentioned, we are trying to not focus on the restart of a reactor; we are trying to focus what's happening at Savannah River on what is necessary to operate those machines over very long times—a decade, at least. Certainly the events of Sunday night, if they are as bad as—if they are the worst case, will have an impact because we will not restart until we are satisfied with operator training and operator attitude.

I might ask Mr. Starostecki to comment.

Mr. STAROSTECKI. Clearly, sir, this is not an isolated event. There are other events that we have seen over the last several months dealing with operator error, nonadherence to procedures. We can't fix these kind of problems with hardware changes, with straightforward training classes. This is an issue that goes to line management responsibility and accountability. Competent and experienced management would not allow this kind of operation to continue.

The experience in the commercial sector indicates that we need to focus on the underlying issues here and deal with them. That is going to take time and we're going to need the support of the Westinghouse organization, and look at rehabilitation for some of the people in the way we do business.

The formality, the control, the discipline of operations just have to be improved. We cannot rely on remedial measures. The first line of defense has to be good, sound operations.

Chairman GLENN. We thought that a lot of these things were going to be taken care of after last summer, and I think you did, too. You thought that the people down there had been sensitized enough that there would be no more operations like this. It would appear that you're going to have to put more outside people in there on a closer supervision basis to make the changes that have to be made.

Have you come to that conclusion yet or are you still looking at it? In other words, having two or three senior people down there that, hopefully, are in the loop enough that they can pick up things like this is not doing the job. Are you going to have to have more people down there and supervise this thing on a more day-in, day-out basis until the attitudes are changed?

Mr. STAROSTECKI. Mr. Chairman, we clearly have to, first of all, rely on an infusion of new management at the top. The workers take their cues from what their management sends the signals on what they perceive they want done.

Chairman GLENN. Well, and management takes its cues from the Department of Energy on what the Department wants done, too.

Mr. STAROSTECKI. We agree with you, sir. We are, in fact, increasing the staffing of the EH Oversight Staff and the Savannah River operations manager has created a dedicated organization just to look after the reactors and has, only now, started getting some

managers from outside the Savannah River complex to come and help organize it. So it is a very slow process. We have learned, I think, from the last 6 months that we cannot have compensatory measures with hardware changes and training overcome the fundamental management problem.

Chairman GLENN. Last summer we were concentrating on Savannah River; we still are. During this time period, have you had similar incidents at different parts of the weapons complex across the country; that would be incidents of a similar nature to this?

Mr. STAROSTECKI. My own experience tends to show that Savannah River is a unique situation. In fact, there are other parts of the complex where we've had positive changes, where there have been a different response to problems. We've been encouraged at the Rocky Flats situation—not that there are no problems there, but the approach to dealing with the problems is different. Similarly, there are activities at Idaho on the part of the contractor there, with a contractor self-improvement program, that are noteworthy. So we tend to look at Savannah River as being a very unique, isolated problem.

Chairman GLENN. Because of what? Because of the nature of their activity there, their industrial activity compared to other areas? Almost the whole complex is run on private contracts.

Mr. STAROSTECKI. Yes, sir. But I think when we look at the reasons for some of the better performances, we find that there's a lot more dialogue with the commercial sector. For example, at Idaho, there's an awful lot of support work done by EG&G for the commercial sector and the Nuclear Regulatory Commission, though they have that kind of interface. The technical isolation, if I can use that phrase, and the lack of a peer review process at Savannah River has developed a sense of complacency.

Chairman GLENN. Mr. Wade, can you tell us—and I don't want to get into a classified area, so tell me if you cannot answer this. If we brought P, K and L back on at a reduced and safe level of operation, what percent of our tritium requirements can be met by P, K and L?

Mr. WADE. I will have to provide you the answer to that in a separate forum, Mr. Chairman. There is a power level below which we cannot meet the requirements. But if I may, I need to provide that to you separately.

Chairman GLENN. All right. Fine. I understand it might be classified. The obvious follow-up question is, if there is a certain level of production we can safely do with P, K and L for the next decade, which you are shooting for as a goal. Assuming that they should be good for the next 10 years or so, then it's possible, of course, we could get by with only one additional reactor. It's possible, as I mentioned earlier, with some of the scientists involved in this field, they feel it could possibly be a linear accelerator type tritium production. Have you looked at that as a possibility?

Mr. WADE. Let me address both of those. The Department has taken the position, and you heard it articulated by Secretary Harrington, that a two reactor strategy is the thing to protect this nation out into the next century, to assure that we have the capacity to provide the tritium that the nuclear weapons complex will require. To do that, we believe that the sound thing to do are two

different reactors of two different technologies at two different sites. That is still the path that we are pursuing at the moment.

We have looked at accelerator technology. In fact, as part of the decision-making process to get to the ultimate decision to build a heavy water reactor and a modular high temperature gas system, the Energy Research Advisory Board which is the Secretary's group of technical advisors, looked at alternate ways of making tritium, accelerators being one of those. Defense programs has, for a good long time, funded research on accelerator production of tritium.

It is my belief that while the physics is well understood, it is not a mature technology and that it is a giant step from where we are today to the size of accelerator that would be required to meet our tritium needs.

In addition to that, arguments in the newspaper talk about accelerators being attractive because they do not generate waste. That's true, but as Mr. Peach said, you need 800 megawatts of power to run the accelerator, and whether that's a nuclear plant or a fossil plant, there is going to be waste generated, so you're not just de facto getting away from the waste problem with accelerators.

We will continue to pursue accelerator technology but at the moment, it is not as mature as fission reactors.

Chairman GLENN. Let me get over just a minute into the budget area here. We've kicked that around a lot today. Your budget submission or what was sent over to us for the Fiscal Year 1990 represents about \$1.4 billion for environmental compliance, cleanup, safety and health activities. GAO's testimony is that somewhere around \$5 to \$8 billion will be needed annually to effect cleanup. I view the startup of this effort as requiring at least \$3 to \$4 billion.

Why does the DOE budget request \$1.4 billion? The second question is what was your original request inhouse at DOE that you sent to OMB to do this job? It came out as \$1.4 billion. What was the input?

Mr. WADE. I don't have the exact figures. There was, indeed, higher—our original request was higher. The newspapers have accounted for, I think, \$300 million shortfall which is a tiny bit misleading. We requested an additional \$300 million but it was for a variety of things, not just environmental restoration or environmental compliance. So the \$1.3 billion number—in the 1990 budget, if you add the way GAO does and add up what is in our environmental compliance line, environmental restoration and waste management activities, which is the way GAO does the arithmetic, the number is \$2 billion. If you do it the way we submit it, it's \$1.3 billion.

Chairman GLENN. The figures we're talking about, though, are about one-fourth what you testified last summer was needed. Why the difference between what was submitted to OMB and what you testified was needed?

Mr. WADE. I think it's a question of ramp-up. Our rack-up of this in the modernization study says that for the environmental restoration line for which we have \$315 million in the Fiscal 1990 budget, that grows to a billion in the mid-Nineties and to \$2 billion at the turn of the century. So it's a case of moving up the curve, Senator, to what you can spend in an economic and efficient way.

Chairman GLENN. Well, when we come down to only about \$300 million—we can see needs for more than that amount for cleanup as opposed to the other things that were in that \$1.4 billion for E, S, H. It's difficult for me to see how you could have asked for anything but the figure that you testified to last summer, that DOE testified to last summer. What I'm getting at is why was DOE's request cut back and was the battle over at OMB such that you got only one-fourth of what you asked for, or was this nearly what you asked for?

Mr. WADE. It was nearly what we asked for. I recognize this is not a good answer, Senator. But within the Department we tried to do, as an agency, what we thought we needed to do in terms of balance between what are obviously conflicting priorities; that of meeting national defense needs and that of beginning this environmental restoration program. We came to what we thought, within the fiscal constraints placed on the Department and on the administration, the best balance we could come up with.

Chairman GLENN. Well, I support the defense needs and have voted so ever since I've been here. But I must say there's a little yellow light going on warning me that maybe we're embarked here on the same process that got us into this mess over the past 40 years, and that we're beginning once again to put an over emphasis on production. I want production but I don't want to see environment, safety and health have any lessened importance. We know that what's gotten us into this mess in the first place and we can't go down that road again.

Mr. WADE. I agree with you, Senator. I can only say that between the 1989 and the 1990 budget, the environment, health, and safety numbers grew by 28 percent. The production numbers grew by inflation, roughly 4 percent.

Chairman GLENN. Right. The whole nuclear weapons complex through the years was given an exemption from OSHA requirements, which every other business in this country has to comply with, but because of security and because of the emphasis on production, OSHA requirements were exempted. Now, while there were EPA requirements that were supposed to be in place, those through the years, by and large, have just not been enforced.

Are the monies that we're talking about here going to bring us into compliance in those areas, as the civilian nuclear area has been required to be all through the years? They have to comply with EPA requirements and with OSHA requirements for workers on site. Will the things that we're talking about here bring the nuclear weapons complex into OSHA and EPA compliance?

Mr. WADE. I think Mr. Brush should answer that. That is the goal over time. Compliance in some areas has been defined in the agreements that we have reached, for example, in the State of Ohio, in the State of Colorado, in the State of Idaho, where we have agreements that involve the Department, the EPA and the State regulatory agencies. The compliance schedule is well defined in those and we fund, as best we can—or we request funds on that schedule.

Mr. Brush.

Mr. BRUSH. I would comment that the needs assessment, the December Report, does identify the figure of \$3 to \$9 billion for envi-

ronmental corrective actions, which is intended to bring us into compliance with EPA and other State requirements.

As far as OSHA is concerned, the safety aspects, I might ask Mr. Starostecki to comment.

Mr. STAROSTECKI. Yes, sir. We do look to the OSHA requirements and we do impose them on the contractors. The difference is that we are not subjected to the OSHA inspections. DOE does its own inspections in this area.

Chairman GLENN. Wouldn't this be an appropriate time to let OSHA do the inspections, as we do for every other activity in the country?

Mr. STAROSTECKI. I think, sir, our dialogue with OSHA has indicated that they don't have the resources and have deferred to our inspections. Our inspections have been showing that we can manage it, and we have an ongoing dialogue with our OSHA counterparts.

Chairman GLENN. Do they spot check your inspections? With all due respect to DOE, we have some other areas that have been neglected in the past that got us into this. So does OSHA spot check your checks?

Mr. STAROSTECKI. I don't believe so, sir. I could find out and tell you for the record after a check.

Chairman GLENN. OK. We would appreciate knowing that.
[The information referred to follows:]

In 1974, OSHA agreed the AEC, a predecessor agency to DOE, had workplace health responsibilities for activities undertaken under the Atomic Energy Act. To the staff's knowledge, OSHA has not inspected any DOE facility covered by the Atomic Energy Act.

Mr. Wade, DOE will be spending about \$9 billion for the weapons complex in fiscal 1990 and out of that, we are proposing to spend only about \$315 million for cleanup. It's difficult to see that that's a balance. I know you don't equate just dollar for dollar for dollar, but it's hard to believe that \$9 billion goes for other things and we only have \$315 million to get the cleanup going.

Mr. WADE. The \$315 million is for specific environmental restoration activities. There's, roughly, a billion dollars in cross-cut funds out of that \$9 million that are for environment, safety, and health compliance issues that are carried in the operating side of the budget. The \$315 million is for environmental restoration projects. So the sum, I would submit, is a great deal more than that. The sum of money being expended for environment, safety, and health matters is considerably more than \$315 million.

Mr. BRUSH. May I comment on that number, Senator?

Chairman GLENN. Certainly.

Mr. BRUSH. You mentioned before the question of the debate that goes on within the Department of Energy on these numbers. It's always awkward for us in the Executive Branch to come up and tell you about what goes on within the four walls of an Executive Department. Let me assure you that the development of that number was a process that involved a significant debate. It does represent nearly a doubling of the figure from the previous year. It is not a problem that we can solve by throwing money at it.

Obviously, you can't take these numbers and simply divide them by 20 years and then appropriate that much money. We don't have

the ability to spend that much money in a year. We have concluded that the \$315 billion for 1990 is an appropriate sum. It can be used—

Chairman GLENN. Million—not billion.

Mr. BRUSH. Million—excuse me, we've been using the word "billion" too many times. \$315 million can be used effectively and we support that number.

Chairman GLENN. Well, I am also aware that within the Department you have your own people, pro and con, on what you can submit but then it comes down to something, like "Well, let's submit something that's not ridiculous, that we know they're not even going to consider at OMB," so then we start cutting down from what your own testimony says was really needed, so the request just doesn't match the requirements of what has to be done.

Then it gets to OMB and they have their own set of priorities and they're fussing with people from AG, Interior and every place else who want money, too. Then you get cut further. It was my understanding that at that point Secretary Harrington, to his everlasting credit, really went to the mat, as I said earlier in fighting for the figure you had put in and he lost. That's our interpretation of it from this end of the avenue. So we hope that you have better luck next time around, and I hope that in the Bush budget changes, when those come up to us, that we do have a better figure.

That would lead to another comment here, too. Mr. Starostecki, you and your people, I think, have done a good job in the effort you've made to improve DOE's ES&H activities. I just hope you get the support you need within the administration. We've talked about this a number of times. I think you have the right ideas in what direction to go. But what kind of signals have you received, if any, from this transition team dealing with DOE's activities?

Mr. STAROSTECKI. Sir, the only signals I can tell you that I've seen are that we do have a problem, that we need to solve it and that I have not had any obstacles placed in front of me, and that we are starting to have a stronger dialogue. The issue is polarized enough, as it is, amongst various contractors, the Department and the safety organization. We continue to find more problems and we're working within the Department to solve those.

Chairman GLENN. How about budget increases? Have you been given any indication that you will have more like what was requested from the Department instead of what was in the Reagan Budget?

Mr. STAROSTECKI. Sir, most, if not all, of what I had requested for the safety side of the house was, in fact, provided for, so we were well supported.

Chairman GLENN. Well, was that what was requested then after you debated it within the Department? It certainly was not the amount we talked about last summer that was going to be needed which was about four times, I think, what came out.

Mr. STAROSTECKI. Sir, the safety side of the budget we have for fiscal 1990 got in fairly good numbers. We are now going through the administrative process of getting staff and getting the money allocated for fiscal 1990 expenditures.

Chairman GLENN. You are involved not with environmental cleanup directly but with current environment, safety and health; right?

Mr. STAROSTECKI. I am limited to the safety, nuclear safety side. The environmental side is handled by somebody else.

Chairman GLENN. All right.

Mr. BRUSH. May I just comment to try to clarify this, Senator, because I think it's important.

Chairman GLENN. Sure.

Mr. BRUSH. The numbers we have been talking about heretofore this morning in the cleanup area, the corrective area, as well as base program, are numbers that are appropriated to DOE program offices, defense programs, energy research, nuclear energy and the like. We were pleased that in the 1990 budget process for the Office of Environment, Safety and Health we received permission to send up, as part of our fiscal 1990 budget request, the entire amount that we had requested from OMB, the entire \$124.6 million for the Office of Environment, Safety, and Health. Those are the monies that fund the oversight functions that Mr. Starosteki operates, as well as the other environment and safety functions of the Department.

Chairman GLENN. It took us a long time to get attention found on some of these things but I've been complimentary of DOE when the leadership finally became sensitized. We have had these reports that I talked about earlier and gave a brief rundown on. These reports have come in over the last 6 months or 7 or 8 months now. So that's great. They at least started the process for us but that's just what I see them as, as a start.

The 2010 report does not include a detailed road map to get us from the present to that year 2010. It contains no specific safety-driven criteria, milestones or projected funded needs for fiscal 1991, 1992, et cetera.

Does the Department have an integrated and comprehensive, strategic plan to assure that current essential facilities will be able to safely carry out their missions? Number one, will they have the ability to do it; number two, can they do it safely, carry out their missions until replacement facilities come on line?

Mr. WADE. The answer to that is yes, Mr. Chairman. We have, in defense programs, a 5-year plan which addresses those things. Now the safety policy to which Mr. Peach referred a couple of times will be issued shortly—in the next few months. It has just come back from peer review.

Mr. BRUSH. We have been working actively on the DOE-wide safety policy document for many months. Just in the past week or so, it has come back to us from the Ahearne committee, the Advisory Committee on Nuclear Facility Safety. We are now going to be looking at the comments from that committee and moving as quickly as we can to put it into place.

Mr. WADE. I think we don't know the budget implications of that safety policy. I believe we are—I know of no show stoppers. I know of nothing in that safety policy, when it is, in fact, promulgated finally as a regulation, I know of no big dollar items associated with new policy.

Chairman GLENN. When will such a report, a detailed road map, if you want to call it—be available in the Department. I ask that with the obvious intent of following it up and saying we need it. We need it over here at this end of the avenue. You need it so you know what you're driving toward there. We need it at this end of the avenue so we can start getting a good base set for keeping the budget pressure on so that there is funding, multi-year funding, to carry out the objectives of your plan. We need that kind of a road map. When can we expect that?

Mr. WADE. Well, Mr. Chairman, I'm not quite sure how to answer that. The modernization report, as it was sent to our authorizing committees carried with it a total of what we thought was the amount of money required over the 21-year period to modernize and do the environmental restoration activities associated with those modernization activities. It was deliberately not broken down into year by year because the determination was that year-by-year funding should be addressed each year as part of the annual budget process. That's why you only have a summary number for the 21-year period.

Chairman GLENN. Yes, but absolutely the most wasteful thing we can do is have big money one year, low the next, up again, down, up again, down.

Mr. WADE. We agree.

Chairman GLENN. It needs to be constant funding. Of all the things I can think of that need to have constant funding, this is it. And if we don't have that laid out, then we don't get that included early on in the budget process. We need a 5-year, a 10-year figure so we can set that up as part of our budgeting process.

Mr. WADE. The modernization study, I think, is the beginning of a road map. It is clearly the best set of data that we have ever had to define where we are now; to define, as best we can project, on what the requirements will be in the year 2010, and then to define the facilities necessary to meet those requirements.

I'm sure it will receive and needs great debate here in Congress because we need support and direction about the speed with which we go and the things we do first, and out of that will come the funding. I hope it is supported in much the way we've laid it out.

Chairman GLENN. In terms of modernization, the 2010 report calls for ending operations, at among other facilities, Fernald, in my State of Ohio, Rocky Flats in Colorado, and some others. There's been a great deal of concern expressed about what, if any, cleanup effort DOE will conduct as those facilities are shut down as far as production is concerned.

Would DOE agree that if it closes down an existing facility in that bomb complex, such a facility should not lose its priority for cleanup?

Mr. WADE. Yes, sir. Part of the philosophy of doing things the way we've set them out in the modernization study was that if the decision were made by the Administration and supported by Congress that we should close out production operations at Fernald, for example; that concurrent with that and consistent with that would be the budget for the appropriate environmental restoration activities, and you would simply switch from production to environmen-

tal restoration. That is the philosophy that governed everything we did in the modernization report.

Chairman GLENN. I've also asked, and the Department has agreed, to do a study on what other uses might be made of a facility such as that.

Mr. WADE. The alternate sites.

Chairman GLENN. Alternate sites.

Mr. WADE. Alternate uses.

Chairman GLENN. Alternate uses study for either other Government work of some kind that the plant might be satisfactory or for other civilian uses it might be converted to. I asked for that not only for Fernald but for other sites across country also. What is the status of that study and when can we expect that?

Mr. WADE. Mr. Chairman, we are actively working on that. We have begun to look at other Government potential uses for Fernald. Quite frankly, I think the most attractive potential use for the Fernald plant might be a transfer to the private sector. That then starts you down the path of legal obligations and liabilities until the cleanup is complete. So it's going to be a complicated question to answer. I will supply, for the record, when we're going to reply to your letter.

[The information referred to follows:]

A response to Senator Glenn's letter of December 16, 1988 was sent by then Secretary Herrington on January 11, 1989. The response called for the studies to be completed by the end of calendar year 1989.

Chairman GLENN. All right. Fine. I would appreciate that. Most of these plants are of such a specialized production nature that just making them into civilian plants may not be practical. But it's certainly worth looking to see whether there are other Government uses or civilian uses for those facilities.

As the work winds down at some parts of the old nuclear weapons complex, we're still doing some modernizing, putting some new equipment in. Is that only being done where there is absolutely no other facility that can do that? In other words, I think there are new facilities being placed in some of the plants that DOE will shut down. Is that correct?

Mr. WADE. I think what you may be referring to, Mr. Chairman, is a project at Rocky Flats. Building 371 is a new plant which does not operate properly. It requires substantial investment to make it operate, but it's a prudent investment for two reasons: One, it will allow us to operate a chemical process that will recover plutonium from waste from which we cannot now recover the plutonium, thereby solving the waste problem. We also will need that facility and its chemical processing for the ultimate decontaminating and decommissioning of Rocky Flats. So we believe that the monies that we need to invest to get that building running at Rocky Flats, even though in a decade or so we may begin the shutdown of that plant, is a prudent investment.

Chairman GLENN. Mr. Bibb, will the administration of cleanup for our area of the country, for Ohio and for Fernald, will that still come under the direction of Oak Ridge, or is the cleanup supposed to be administered in a different way?

Mr. BIBB. No, sir. That will still come under Oak Ridge, Senator.

Chairman GLENN. Are you gearing up for that now? How much is being spent on the cleanup there right now?

Mr. BIBB. Senator, in this year's budget about 75 percent of that plant's budget will be devoted to environmental cleanup, health, and safety upgrades.

Chairman GLENN. Which is how much?

Mr. BIBB. If you can give me a moment to find my number here.

Chairman GLENN. Certainly.

Mr. BIBB. I don't have that number off the top of my head. May I just provide that for the record?

Chairman GLENN. Yes, that will be fine.

[The information referred to follows:]

The fiscal year 1989 Feed Materials Production Center (FMPC) budget for ES&H is \$103.6 million out of a total budget of \$198.2 million.

We've had a Dose Reconstruction Study, as it's called, going on at Fernald there for some time. Nearly 4 years ago I asked DOE to carry out such a study, to estimate radiation doses to residents living near the Fernald facility. The request was initiated after some preliminary calculations by my staff, which were validated by EPA, suggested that during the fifties and sixties there may have been radiation emissions beyond the boundary of the plant equivalent to literally hundreds of chest X-rays. After several delays and false starts, the study is not yet complete.

Now the people living near Fernald, I think, deserve honest answers about the kind of risks to which they have been exposed. I think something like that should have had priority attention. Why has it taken so long to perform that study?

Mr. BIBB. Mr. Chairman, maybe I can take you through the whole scenario here.

Chairman GLENN. Good.

Mr. BIBB. In April of 1985 when you asked the Centers for Disease Control to actually look to see whether or not an epidemiological study was warranted, they and EPA came to us. We provided them the best data we had at the time, which was that that plant had released some 95,000 kilograms of uranium to the environment, the number which we used at your hearing in Cincinnati. That data was based on essentially a look at some records. There was not monitoring at the plant in the early days of operations. It was basically all rough estimates.

Both the Centers for Disease Control and U.S. EPA Region 5 in Washington felt that data was not even close to being adequate for their needs. They directed that we go back and do a much better job of—

Chairman GLENN. Was inadequate data given to them? Why was not complete data given?

Mr. BIBB. It wasn't so much that it was inadequate. For them to run the calculation on a model, particle size and distribution had to be determined because that determines how far out it goes. You can't just say X kilograms because the EPA model is a fairly sophisticated calculational model. It is very sensitive to the size of the particle.

Chairman GLENN. Was that information not available or was it held back?

Mr. BIBB. No, sir, it was not available. As a matter of fact, we actually had to go run the experiment because we didn't have the data.

I can't emphasize enough, Mr. Chairman, that this data just does not exist. We are moving into a new area here where we're trying to create data, as best we can, based on our records of past operation. But to be able to say we went back and did this through monitoring, the monitoring records from the early days of the plant's operations are just not there. As you remember from previous hearings, there were not stack monitors on many of the stacks.

We have continued to up the number. The most recent number from this past year now puts the airborne releases from that plant at something over 140,000 or 150,000 kilograms, if I remember correctly, just from going back and looking and identifying more and more sources.

The data was essentially ready to be turned over to CDC and EPA this past summer, at which time it was discovered that there was an additional source in the plant which had never been taken into account, which had counted some additional 40,000 kilograms of additional uranium which had been discharged.

Since that time we have met with CDC. We have had to go back and totally recalculate all of the data we have to date. At the end of this calculation, which has just recently occurred, we have proposed now to have a group of outside experts look at the data to determine if they agree that that is probably as good as we're going to get.

Chairman GLENN. Maybe I don't understand the model that you're working toward here. It would be nice to have all these estimates of what happened through the years, then you say, "Okay. Now, we'll look at the rest of it." It seems to me that when you've had over a generation of experience with things coming out of the plant and settling down over the community—we've had a whole generation of people grow up—you can use empirical data by going out and running community studies to see what has happened compared to other parts of the country.

We've had, in the Southwestern part of Ohio, there is an area there that has always, for unknown reasons, had a little higher cancer rate than the rest of the state and the rest of the country, as I understand it—I'm not an expert in that area at all. But even then, with a 35- to 38-year period since that plant has been in operation, things coming out of it and settling down on the community, you certainly could make a study, or CDC could, it seems to me. Just go out and make studies, "Do we have more cancer deaths than is normal around the area? Do we have more births with birth defects?" You could run the whole study, it seems to me, and come up with empirical data, "Here's what's happened in the normal downwind pattern from that plant." That's basically what we're looking for.

Has it been your opinion that they're using your lack of data as an excuse for not doing the study?

Mr. BIBB. Senator, I don't think there has been any—I haven't sensed any reticence on CDC's part not to do the study. What they were trying to do, though, is make very certain that were they to do a study and relate it to the plant operations, they would like to

at least have enough data to assure themselves that there was a chance you would find something in such a study.

Chairman GLENN. I think you could make a pretty good case for the downwind pattern from the plant and the downstream flow in the aquifer level under the plant. That would be a good place to start, it seems to me.

Mr. BIBB. Senator, I can't disagree with you. I'm just in the business of collecting the data. The analysts belong to another organization.

Chairman GLENN. I understand that. You're not running CDC, and I appreciate that. Maybe we will approach that one from a different direction.

Just to follow up a little bit on that, what's being done right now? Do you still have a team trying to get this together, and is CDC just waiting? What you're saying is there is no such information, and CDC has told us they can't move until they get the information from Fernald. Something has to give here.

Mr. BIBB. Mr. Chairman, we will be meeting either this week or next week. The only holdup now is getting outside experts to agree to take the time to review the data, at which point we will turn it over to have the dose estimates done and the whole thing given to CDC. All I have to do now is get the outside experts to review the data and agree that it's okay. And that is just a scheduling problem with their schedules.

Chairman GLENN. Is there better information available at any plant in the whole DOE complex? Does any place have this? In other words, we have stories about what happened downwind of Hanford when they made some intentional releases years ago. People there are claiming, at least, additional cancer deaths, thyroid cancer in children they think are due from the plant. Is there any better release data on Hanford, Rocky Flats and other places than there is on Fernald?

Mr. WADE. My impression is that the situation at Fernald is, indeed, different, Senator. At the other locations, Hanford in particular, where they did those release experiments, they did monitor those releases and have some actual data. In the early days at Fernald, my understanding is there was no monitoring.

Mr. BIBB. That's correct, Senator.

Mr. Chairman, what we're trying to do is go back and basically create some history by using our best estimate of what the through-put was at the plant, what one might have assumed was operation from each one—and its never going to be anything more than an estimate. I don't think we will ever reach the point where we will be able to nail it down.

Chairman GLENN. Everybody wants CDC to put a priority on the operation that's close to home, obviously, to get the estimates. We're already being pressured by citizen groups to set up a trust fund. We have the precedence of the Atomic Veterans that were used out in the desert, back in some of the early nuclear explosive experiments, of the Government having, at least in part, taken responsibility for seeing that there's a trust fund set up for them.

Now we find people at Fernald and other places, already citizen groups organized. They have hired lawyers and are trying to push for things like that. So we are at a loss until we can get CDC or

some proper organization to really run a community-wide study at Hanford, at Rocky Flats, other places, and this is going to be building pressure—I know that right now. So we need that kind of information if we can possibly get it.

Mr. BIBB. We already have one other set of information, Mr. Chairman. As you well know, in support of the class action lawsuit, we have provided to the court an enormous amount of data which was independently collected on samples throughout that either 5- or 10-mile radius. So there's an enormous amount of data which has been provided the court.

Chairman GLENN. The staff points out to me they also advised the court that the operator of the plant back in those days had been told to "Don't worry about the emissions. Just continue operating the plant," so that's in the courts also. That was one of the first areas where we got involved with Fernald where we had the bag house, the infamous bag house that had rips in it, from which uranium dust was coming down. It had a warning signal hooked up to it, and the solution to the warning signal—instead of shutting down the plant, shutting down the flow, was to go over and shut off the warning signal and continue operations. So that's what was going on back in some of those times past, also.

Mr. BIBB. Well, having had the honor of conducting the tour with you, sir, I'm painfully aware of that.

Chairman GLENN. Yes, I know you're aware of it.

Along that same line, a large number of the documents on Fernald's operating history show that scrubbers and dust collectors, particularly in Plant 8, were being operated in a state of serious deterioration or had nearly lost all of their dust removal capability. Official estimates of how much uranium was released at Fernald were based on the assumption that the scrubbers were operating at design efficiency.

Do your revised estimates of uranium releases still operate under this assumption, or have you updated those to a higher figure?

Mr. BIBB. That was my point I made earlier, Senator. We've continued to update and raise the figure. The figure has not been dropped at all. The figure for the total plant releases are going up every time we go back and look at them.

Chairman GLENN. What is your estimate now of what the total release in the community was through the years? Do you have a figure for that?

Mr. BIBB. Yes, sir. If I remember correctly, it's 175,000 kilograms.

Chairman GLENN. How much?

Mr. BIBB. It is 175,000 kilograms.

Chairman GLENN. One hundred and seventy-five thousand kilograms. Okay. That's about 350,000, 360,000 pounds.

But do your new figures that are coming out now, include the fact that the bag house had rips in it and so on; or are your estimates still based on the design operating efficiency?

Mr. BIBB. Senator, as you know, in a search of the records, you will find there was hardly a month went by that the bag houses operated at their design efficiency.

Chairman GLENN. Have you figured that into this—

Mr. BIBB. Yes, sir.

Chairman GLENN [continuing]. That it was not operating at design efficiency?

Mr. BIBB. Those data are actually pulled out of those unusual occurrence reports, which we provided you a year or so ago.

Chairman GLENN. Well, is your 175,000 kilograms based on design efficiency or does that include the rips in the bag house?

Mr. BIBB. That includes abnormal operations which released over and above what design efficiency would have brought about.

Chairman GLENN. All right. So this is really our best guesstimate right now on what actually happened, is the 175,000 kilograms?

Mr. BIBB. Yes, sir, and that's an estimate. I'm not about to sit here and try and provide it as a hard number.

Chairman GLENN. Mr. Wade, according to ES&H spending contained in DOE's environmental activities reporting system, EARS, the Savannah River plant is to receive over half of the \$1.4 billion in the fiscal 1990 budget for ES&H activities. Given the widespread nature of DOE's ES&H problems, is that a fair and objective distribution of those funds?

Mr. WADE. Mr. Chairman, I am advised that about one-third of the total Defense Programs' ES&H spending is allotted to Savannah River plant. That includes the safety upgrades for the Savannah River reactors as well as the environmental activities at Savannah River. So there are more than just environmental cleanup activities in that number and, therefore, it probably is a fair distribution.

Chairman GLENN. As far as safety problems go, aren't there comparable safety problems at other sites, too? These are safety problems we're talking about now.

Mr. WADE. Well, we're talking about the things necessary to allow us to restart the Savannah River reactors and operate them for a decade, and that presents us with unique problems. We don't have a similar situation anywhere at any of our sites.

Chairman GLENN. I'm just sort of wrapping up here with a few questions in different areas.

Mr. Starostecki, I got into this a little while ago. Based on your experience with the DOE complex, do you find the problems at Savannah River, with respect to attitudes and procedures and policies and some of the deficiencies there unique to Savannah River or are these found across the whole weapons complex?

Mr. STAROSTECKI. Those attitudes towards safety and procedure adherence I think can be seen historically throughout the complex. It is the approach that some of the contractors and operations offices have taken to resolve them that is different. For example, there are a lot of historical problems at Rocky Flats with adherence to procedures and radiological protection and contamination control, and over the last 12 months I think great strides have been made toward improving them and putting new programs in place to correct them. It will take a few more years, for example, at Rocky Flats, to get those kind of changes fully implemented into the work force.

Savannah River, however, I think exhibits a fairly unique problem because it is also a unique site with the various nature of facilities that it has, and is the only site that would be somewhat self-contained.

Chairman GLENN. Recently, DOE's Office of ES&H issued an appraisal of the Health Physics Program at the Savannah River plant. The report finds a lack of effective management controls, a lack of management responsibility for contamination control in the work place, the failure to maintain state-of-the-art practices and procedures and the lack of effective oversight by DOE.

Mr. Starostecki, do you believe that the problems plaguing SRP's—Savannah River's Radiation Health Protection Program, can be found throughout the DOE complex?

Mr. STAROSTECKI. The difficulty with the health physics and radiological protection program is, in fact, not unique to Savannah River. That's a problem that is found throughout the complex. In fact, it was problems elsewhere—at Rocky Flats, at Fernald, at Richland—that prompted me to ask for an overall, integrated health physics review at Savannah River.

Part of it stems from the fact that we in the Department have not had an adequate standard to impose on contractors and we have not kept pace with the commercial industry in terms of improved radiological protection practices. So that was not a major surprise. It is a problem that is widespread and we are, in fact, dealing with it through a revised order that has only been issued a month ago.

Chairman GLENN. One last question. If we had the money, do we really have the expertise and the people to do the cleanup that needs to be done? I've been presuming that many of the people working on these sites would also be the same people that would be working there during cleanup, but that may not be the case. Would you comment on whether if we had the money, do we have the technology and do we have the people, do we have the equipment to do the cleanup that has to be done?

Mr. WADE. I think as a nation, we have it, Senator. I think while, in fact, we have very competent—by and large, competent contractors at all of our sites who would carry out these activities, they're going to need some specialized help from big architecture, engineering firms, big construction firms. And I think a very important component of this over the next couple of decades, as Senator Bingaman mentioned, is to make sure, by doing R&D and pilot plant work, that we are doing the right thing, that we are doing what is the most efficient and economical cleanup. That, to me, is important, and that talent exists, too, in the national laboratories.

Chairman GLENN. Well, it does. Are we going to use many of the people that are working on these sites now? Will their employment continue, probably, during the cleanup to do that new job?

Mr. WADE. I would hope so. That is the intent.

Chairman GLENN. I do have one more question. The waste isolation pilot project some of the waste was going into WIPP eventually, we thought. Now there's some holdup on it. Can you tell us what the status of the WIPP project is?

Mr. WADE. We are on a schedule, Senator, to open the waste isolation pilot plant sometime late this calendar year. There are some things that we as an agency have to complete; for example, the NRC certification of the containers that will be used to transport the waste to WIPP. We have to finish the final safety analysis report. We have to finish the peer reviews of the 5-year plan, and

we have to finish the supplement to the environmental impact statement. The activities I have just described will take us to about midyear.

We also require some sort of land withdrawal action, either legislation from the Hill or administrative from the Department of Interior. We are pursuing both of those on a parallel path. We are hopeful that we will get the facility open in the September/October time frame.

Chairman GLENN. Thank you very much. You've been very patient this morning, and I appreciate it. We will have another hearing tomorrow morning at 9:30 here.

Our witness list tomorrow will be start off with three Governors. We will have Governors Celeste of Ohio, Governor Andrus of Idaho, Governor Romer of Colorado. The second panel will be our State Attorney General of Ohio who took the lead in negotiating what I think was the first ever agreement with DOE, with EPA and how we're going to carry out some of those cleanup functions. I think the agreement that they worked out can well be a model for what other states will undoubtedly follow. That was hacked out over quite a lengthy period of time, so we want his experience on that as part of our record.

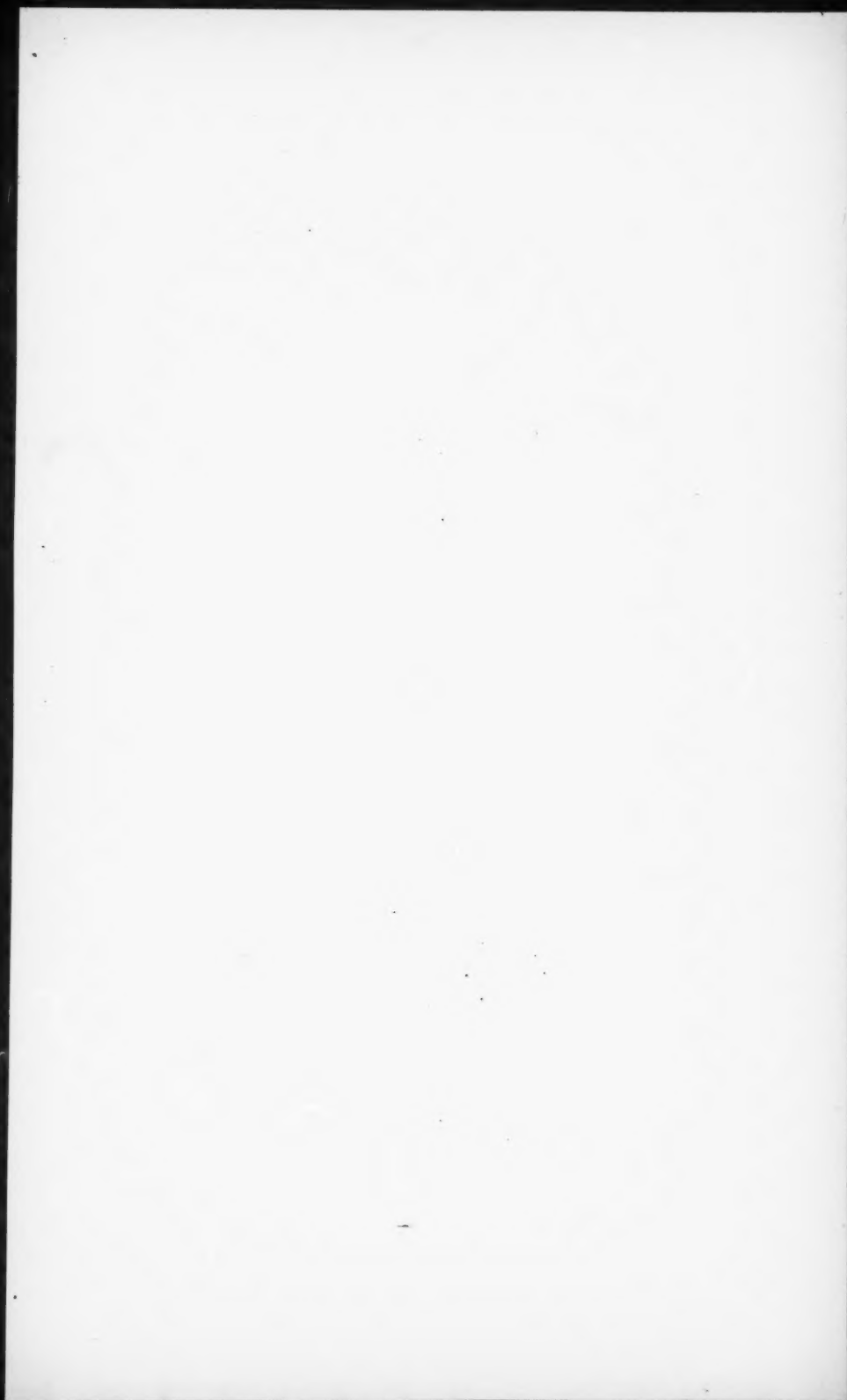
Panel three will be EPA, Environmental Protection Agency, Dr. J. Winston Porter, Assistant Administrator for Solid Waste and Emergency Response, accompanied by two other people also from EPA, Christopher Grundler who is Director of Federal Facilities, Hazardous Waste Compliance Office, and Richard Sanderson, Office of Federal Activities.

The fourth panel, Dr. John Ahearne, Chairman of the Advisory Committee on Nuclear Facilities Safety who has been referred to repeatedly here today with the Oversight Committee, and also Dr. Richard Meserve of the National Academy of Sciences. So we have a big hearing tomorrow and we will try to get started right on time.

We appreciate you being with us today and thank you very much. I hope you will respond to questions that we may have from other members of the Committee who were not here. Thank you very much.

The hearing will stand in recess until tomorrow morning.

[Whereupon, at 12:31 p.m., the Committee recessed, to reconvene at 9:30 a.m., Thursday, January 26, 1989.]



OVERSIGHT OF CLEANUP AND MODERNIZATION PROPOSALS FOR DOE'S WEAPONS PRODUCTION COMPLEX

THURSDAY, JANUARY 26, 1989

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, DC.

The Committee met, pursuant to notice, at 9:32 a.m., in room SD-342, Dirksen Senate Office Building, Hon. John Glenn (Chairman of the Committee) presiding.

Present: Senator Glenn.

OPENING STATEMENT OF CHAIRMAN GLENN

Chairman GLENN. The hearing will be in order.

Today, the Governmental Affairs Committee is holding its second day of oversight hearings—after a long list of hearings we have had through the years on the same subject—on some of the major problems facing the U.S. Department of Energy nuclear weapons program. In an attempt to better understand the full scope of these problems and the proposals to solve them, the Committee today will look into questions surrounding the management of nuclear waste and hazardous waste, as well as nuclear safety policies.

Now, to solve some of these problems, it is quite obvious to anyone who has looked at this that it is going to require a great deal of Federal and State cooperation. The Federal Government has held on to the preeminence of deciding what should be done in this particular field, but that does not mean the Federal Government is going to be able to do this job alone. It will not. There has to be a great deal of State cooperation and State activity if we are going to make progress on this.

So we have some major problems with waste and where it is going to be stored, and I am sure that will be addressed by the witnesses that we have here today. We have the ongoing problem, also, of how we carry out EPA mandates and how we administer those mandates, since States have agreements to carry out EPA law. It is not a direct contract, but, in effect, it is a contract where the States administer what has been mandated by the Federal Government.

I would say today that on our second panel, when we have the Honorable Anthony J. Celebrezze, the Attorney General of our State of Ohio, I'm not trying to make this an Ohio hearing. But Tony, whom I have known for a long time, took the lead in trying to work out some cooperative efforts and get a consent agreement

signed that we think is a landmark agreement. It is the type thing that other States will have to follow through the years in working out similar agreements. So we have those types of problems and the people to address them here today.

I am very grateful that Governor Celeste of my State of Ohio, Governor Romer of Colorado, and Governor Andrus of Idaho were willing to make time available in their very busy schedules to offer their insights to this Committee.

I am also pleased that, as I said, Ohio Attorney General Celebrezze could participate in the hearings because I consider all their views to be of great importance to our deliberations, particularly since they deal with DOE's burgeoning environmental safety and health problems on a daily basis in their States. So their insights will be helpful in our efforts to seek ways to address the enormous difficulties before us.

In addition to the governors, we have had several Senators who wanted to testify and make brief statements before we started our hearing this morning. We will accommodate them, as we always do here in the Senate back and forth between Committees. Senator Brock Adams is here this morning, as is Senator Metzenbaum, and I understand that Senator Wirth was probably also going to come by this morning at the beginning of the hearing.

Senator, is the other lady with you this morning?

Senator ADAMS. Yes. She is here, and I am ready to proceed.

Chairman GLENN. All right. And you will introduce her?

Senator ADAMS. I will.

Chairman GLENN. All right, good. We will start off in the order in which I happen to see them come into the room, I guess. Senator Adams, why don't you lead off with your statement this morning?

**TESTIMONY OF HON. BROCK ADAMS, U.S. SENATOR FROM THE
STATE OF WASHINGTON¹**

Senator ADAMS. Thank you, Mr. Chairman. Before saying anything else, I want to tell my good friend and fellow secretary, Cec Andrus, not only good morning, but thank you for letting me have a seat this morning as they came in.

Governor ANDRUS. Happy to help you out, Brock.

Senator ADAMS. Since we split Union Station, it has been a long time.

Mr. Chairman, I want to apologize to the governors for taking a few minutes of their time, but this is terribly important to us. I have a proposal that I would like to be certain is made public this morning. And our governor, who has worked closely with the Western Governors Conference, Governor Booth Gardner, has a representative here who will briefly state what he has. But I will cover what we are trying to do in the State because we have the Hanford Works there. Governors, believe me, we are certainly with you. This is very much a joint effort, and good morning to all of you.

Mr. Chairman, I want to thank you and, above all, I want to commend you, Mr. Chairman, because during some dark days since I have been in the Senate, you have been a tower of light and

¹ See p. 200 for Senator Adams' prepared statement.

strength on this issue. With your diligence and your commitment and thanks to your leadership, I think we are finally going to be able to focus on the health and safety problems at DOE facilities.

I particularly appreciate the efforts that you have gone through with Senator Metzenbaum, myself, with GAO, to get estimates on exactly what the problem is. And certainly no one is better qualified than a person with the experience that you have had in the military to understand the balancing and over-balancing, in this case, of production versus safety and health matters in facilities that we all have in our States.

I am very proud that you have been able to get this, and I believe the public record should show that we are going to move on it. This morning, I would like to ask unanimous consent at this point to submit the testimony of Governor Booth Gardner, Governor of the State of Washington.

Chairman GLENN. Without objection, it will be included in the record.¹

Senator ADAMS. Governor Gardner is a strong supporter of this. As with all governors, he has his legislature in session, and it makes it very difficult to be in two places at the same time. He wanted to appear, but because of these obligations, he has asked that Ms. Christine Gregoire, Director of the Washington Department of Ecology, who I am accompanied by, make a few remarks right at the end of my time.

Chairman GLENN. Fine.

Senator ADAMS. Ms. Gregoire is here, and I assure you that she will be very brief, and she speaks for the governor.

Mr. Chairman, my brief facts are these: What has been shown in the report is that the Hanford site, with which in this Committee and others are all familiar, has more waste than any other site in the United States. And over 90 percent of this is attributable to the defense activities of the United States, legitimate defense activities. Ninety-eight percent of the costs of cleaning it up are due to the nuclear facilities that are there.

Mr. Chairman, what the report has shown is that we at current funding rates of over \$1.1 billion a year, it would take 70 to 100 years to clean up the DOE defense sites. I will not repeat, because I know the governors and you are familiar with the fact that we have, for example, 149 tanks single shell, filled with radioactive what we call "gunk." It is the material left after having drained everything off. It is highly radioactive, highly chemically active. It is leaking into the aquifer. We do not know whether to dig them up or to vitrify them, and a technology is going to be required to handle that. It is a terrible, terrible situation.

But it is my experience—and I want to speak now, and I am so pleased that Governor Andrus is here because I am sure he will echo this, as a former Cabinet Secretary. Having dealt with long-term projects, Mr. Chairman, I think it is absolutely essential, if you are dealing with a construction project or a long-term commitment, that we have a type of trust fund, a dedicated financing system. At one time, I was not an advocate of these. I was a budget

¹ See p. 313.

Chairman and felt everything should go in and go out in one year. But I have become convinced over the years that a proposal is necessary to see to it that we maintain a commitment for the 30 to 40 years that this is going to take.

I will reintroduce, Mr. Chairman—and I hope many members of the Senate will join with me; a number have already—to create a dedicated trust fund. It would be allocated, then, Federal and commercial, because I think we are going to have to bring the private sector into this, too. And I am hopeful that we can produce an income stream for them that, using the technical advances that we are making in the laboratories there, we can begin to handle these matters better than simply through burying them in the ground. It is absolutely essential to shorten that time period.

This would provide for the cleanup, de-commissioning, which is going along continually, of subs and other matters, and the long-term surveillance costs of the DOE nuclear facilities.

Now, everybody wants to know financing, and I have heard one program after another where everybody says: You have got a great plan; how are you going to finance it?

I propose the following: That the DOE trust fund would come from: first, a portion of the DOE defense budget, because if you are making the materials, part of the cost of manufacturing it is to take care of the waste at the end. Any manufacturing company can and must do this.

Second, the DOE nuclear energy and research budgets. In other words, if we are going to take care of this waste, it is necessary that it be a carrying Government cost down through the years.

Third, the commercial users of DOE services, such as uranium enrichment services and nuclear isotopes sales, should pay a portion. Each one of these, this is a proportional cost. It goes into the fund and is dedicated to taking care of these through the sites that go through the States of all the governors here and others.

Those such as the Navy that use the DOE nuclear facilities or services should also pay.

It would also come into this fund from the fines, fees, and penalties assessed against DOE and its contractors for violations of Federal environmental laws, as well as interest earned on the trust fund receipts.

Mr. Chairman, there are other alternatives, and I hope at some point during the course of this year we will discuss them. I have indicated to people that if we are going to use, for example, a gasoline tax of massive size to reduce budget deficits, a portion should be set aside to protect the State's interests in having their fund, being certain that the Federal fund is being spent. But a penny alone out of that would produce a billion dollars a year into this fund for cleanup. And this is an energy source and an energy substitute fund.

It is a dedicated national solution, Mr. Chairman. I will not go any further now because I know many others are waiting to testify. But Governor Gardner and I believe that we can address these needs. We believe the private sector will come in to help develop these if we can develop an income stream that will produce a stream for them to develop these technologies and to use them throughout the United States.

Now, I would like to briefly introduce Ms. Christine Gregoire, Director of the Washington State Department of Ecology, to just briefly summarize the State's immediate regulatory problems, because I know that is what each of the governors are here to do, and we want to fill in that picture.

I thank you, Mr. Chairman, for your courtesy, and the reason for my being out of breath is that we have the impeachment proceedings in front of Rules this morning. So that is why I am going back and forth. I apologize and thank you for your courtesy.

Chairman GLENN. Thank you.

TESTIMONY OF CHRISTINE GREGOIRE, DIRECTOR, WASHINGTON STATE DEPARTMENT OF ECOLOGY,¹ ON BEHALF OF HON. BOOTH GARDNER, GOVERNOR, STATE OF WASHINGTON

Ms. GREGOIRE. Good morning, Mr. Chairman. My name is Christine Gregoire. I am the Director of the Washington State Department of Ecology. I have had the opportunity to deal with the issue that is presented to you today not only in that capacity, but immediately preceding this role, I was a Deputy Attorney General for the Washington State Attorney General's Office.

I am grateful for the opportunity to relate to you the two key issues frustrating cleanup of the Hanford Reservation in Washington State. The State of Washington has been negotiating with Energy to address the largest and most complex contaminated Federal facility in the country, with an estimated cleanup cost of \$48 billion to extend over 30 to 50 years. Like the State of Ohio initially, we have chosen thus far to negotiate to avoid the cost and delay of court litigation.

At the outset of the negotiations, we identified two key needs: First, a commitment to funding the cleanup work; and, second, enforceability of the agreement that we hoped we would ultimately reach.

Today, after almost a year of negotiations, those are still the key issues, and, like Ohio, we are reluctantly having to consider litigation.

Cleanup is a national, not a local, problem. We, the States, need a stable, long-term funding for cleanup of all DOE facilities before further human health risks and environmental degradation. We in the State of Washington agree with the concept and the goal of Senator Adams proposal.

We also need enforceable agreements to hold DOE to its word legally. Therefore, we support a waiver of sovereign immunity legislation on this issue. Washington and the other States ask nothing more of the Department of Energy than Federal and State laws require of other governmental entities, as well as private business and industry. Neither the lack of money nor sovereign immunity are defenses to compliance with our laws by anyone else.

We have asked Energy to step up to the same legal and societal responsibilities as Congress has required of the rest of this country. We ask for your help in addressing these key issues facing all the States with Energy facilities.

¹ See p. 203 for Ms. Gregoire's prepared statement.

On behalf of Governor Gardner from the State of Washington and the citizens of our State, we thank you, Mr. Chair, for this opportunity to share with you our brief view of this national problem. And we thank Senator Adams for this opportunity and the governors and the Attorney General from Ohio for allowing us to speak.

Thank you, Mr. Chair.

Chairman GLENN. Thank you, Ms. Gregoire. Thank you very much.

Senator Metzenbaum.

TESTIMONY OF HON. HOWARD M. METZENBAUM, U.S. SENATOR FROM THE STATE OF OHIO

Senator METZENBAUM. Senator Glenn, first I want to indicate to you how pleased I am to see Governor Celeste. Attorney General Celebrezze, I understand, is on his way. Both of them have given great leadership in this area and indicated their concern. And certainly you, Mr. Chairman, are entitled to the gratitude of all of us for moving quickly and forcefully on one of the most critical issues facing this Congress and the new administration.

You have led the fight to reform our Nation's decrepit nuclear weapons plants, and through your Committee's diligent work, you brought this scandal to the public's attention.

I want to say, Mr. Chairman, I will continue to support your efforts to obtain greater independent oversight of DOE's weapons production activities. At the same time, I will renew my own effort to make DOE contractors accountable for their actions.

My approach is simple. If there is an accident, and if the Government or its contractors are involved in deliberate misconduct or extremely careless behavior, then they shall be held accountable to the American people. It is absurd that they do not now accept any of that responsibility.

Just yesterday, new reports emerged about unsafe operations at the Savannah River plant. Once again, the contractor kept the Department of Energy in the dark. It has happened time and time again, and it will not stop until the contractors know that they will be prosecuted or made to pay for their gross negligence or willful misconduct.

For the Congress to constantly provide a barrier to keep those contractors immune from liability is absolutely an absurdity of the first order.

Finally, let me mention one last thing. Those people who have worked in those weapons plants and who have been injured were injured in the line of duty to our country, in much the same way the people who live near those plants and who may be injured, granted unknowingly, were making a sacrifice in the name of national defense. Those who have been harmed deserve compensation. No amount may ever be adequate. But they are entitled to their day in court.

Frankly, it is unfair and it is un-American to deny them that right. I will make an effort to secure them that right and allow them to file suit against the parties who have permanently and painfully wronged them.

Mr. Chairman, I appreciate the opportunity to appear before your Committee this morning. I look forward to working with you and everyone here as we try to bring about a beginning to the end of this nightmare.

Thank you, Mr. Chairman.

Chairman GLENN. Thank you, Senator Metzenbaum. Thank you very much.

Our first panel this morning includes three governors: the Honorable Richard F. Celeste, Governor of the State of Ohio, accompanied by Richard Shank, who is Director of Ohio Environmental Protection Agency; also the Honorable Cecil D. Andrus, Governor of the State of Idaho; and the Honorable Roy Romer, Governor of the State of Colorado.

Gentlemen, we do appreciate, truly, what I said in my opening remarks, your changing your schedules and being willing to accommodate us here this morning and being with us.

Governor Celeste, would you lead off with your remarks this morning.

If anyone wants to summarize their remarks, that is welcome. In any event, your entire statements will be included in the record.

TESTIMONY OF HON. RICHARD F. CELESTE, GOVERNOR, STATE OF OHIO,¹ ACCOMPANIED BY RICHARD SHANK, DIRECTOR, OHIO ENVIRONMENTAL PROTECTION AGENCY; HON. CECIL D. ANDRUS, GOVERNOR, STATE OF IDAHO;² AND HON. ROY ROMER, GOVERNOR, STATE OF COLORADO³

Governor CELESTE. Thank you very much, Mr. Chairman. I am delighted to be here with my colleagues, Governor Romer and Governor Andrus, on this important matter. I appreciate the opportunity to testify from the perspective of the Governor's Office in Ohio about our concerns relating to the management and cleanup of the Nation's nuclear defense production complex.

As you know, especially Ohio has more individual facilities that are part of this complex than, I think, any other State in the country.

I would like to begin by echoing the remarks of Senator Adams and Senator Metzenbaum about how much we appreciate your leadership, Mr. Chairman, on this issue, because you have certainly been its champion within the Congress and have helped to bring the public's attention to this enormously important problem. We are deeply grateful for it.

Partly as a result of your ongoing efforts and that of some of your colleagues in the Congress, the Nation's nuclear weapons production complex has come under increasingly intense public scrutiny in recent months.

The public has realized that the Government has been operating a potentially dangerous network of facilities across 23 different States, with none of the kind of safety precautions, or accountability procedures which are imposed on commercial nuclear reactors. What we saw was a disturbing example of our Government not

¹ See p. 212 for Governor Celeste's prepared statement.

² See p. 221 for Governor Andrus' prepared statement.

³ See p. 226 for Governor Romer's prepared statement.

practicing what it preached, nor, indeed, what it regulated when it came to others.

During the campaign and since, President Bush has pledged his administration as committed to a new era of leadership in environmental protection. And I just met with Secretary-designate Admiral Watkins, and he certainly indicates he is enthusiastic about that commitment.

But that pledge will not be met unless the President makes a qualitatively different kind of commitment than previous administrations and provides the leadership with the Congress to find the resources necessary to back it up.

Because you and, I suspect, members of your Committee are already familiar with the problems that plague the complex nationally, let me just focus on my own impressions of the DOE weapons production facility officially called the Feed Materials Production Center in Fernald, Ohio, a small town just northwest of the Cincinnati metropolitan area.

My visit to the site last November left me with three important impressions. The first is the sheer magnitude of the problem and the subsequent effort which is necessary to resolve it. It is enormous. Second is the need for commitment and leadership to do something different, clearly different from what has been done historically at facilities like Fernald. Third is the new inklings of a spirit of a cooperation which we see emerging among the Federal Government, the Department of Energy and States, and our own environmental protection agencies.

The executives from Westinghouse who met me, and particularly the men and women who work there, summed up the problems and the solutions pretty candidly. Particularly, they told me they were frustrated because they did not know enough about the Department of Energy's plan to clean up the facility. They, the contractors, did not know enough about the long-term commitment of the Department of Energy, the kind of resources that would be made available. They said that if I did nothing else upon my return to Columbus, I should fight for sufficient appropriations and leadership from Washington to allow them to do this job, because they would like to be as committed to cleanup as they are to production.

I am going to omit some of my testimony since it will be part of the record, but let me carry on that Ohioans, not knowing the dangers that were involved at this plant, trusted the United States Government, believing that it would protect them from whatever was going on in those gray buildings behind the high fences. As you know, because they have turned to you and you have expressed these concerns effectively to the Department of Energy, they were greatly disappointed.

After I took office in 1983, my administration pushed for access to these facilities in Ohio to make our own determination of their safety. We had to go to court to force DOE to allow our people to inspect, and we were appalled by what we discovered. We were increasingly concerned as each new investigation reveals even greater contamination.

There is some potentially good news, however. If we act decisively now, we can prevent massive contamination from the waste seeping into the water supply feeding the rural communities there.

If we act decisively now, we can do the right kind of environmental cleanup. If we act decisively now, we have a second chance at Fernald and places like Fernald to do the thing right.

Today, we are winning the legal battles, and other States are following our example. You mentioned that our Attorney General, Tony Celebrezze, has worked on two historic agreements with the U.S. Department of Energy, and he will be discussing those with you in detail in a few moments.

I would simply like to emphasize that the Fernald agreement that we have achieved does not address the vast contamination problems that exist there. These are still being uncovered, and they must eventually be dealt with.

Mr. Chairman, we are proud of what we have accomplished, but we also know that it is not enough. We are pleased that implementation of these agreements is under way, but that, also, is not enough. We still have no commitment for the comprehensive cleanup of the Fernald site, which may cost anywhere from \$1 billion to \$5 billion.

In fact, rather than clean up this Superfund site, the Department of Energy now proposes to close Fernald and move its operations to other facilities. Consistent with historic, the 2010 Report, a blueprint for the future of the Federal nuclear weapons production complex, continues to favor production over cleanup. It shows beyond doubt that the Department of Energy prefers to construct new facilities, or at least still recommends that the thrust be construction of new facilities, and leave environmental restoration of old facilities with far less than is necessary to accomplish the job.

This report is one of several that have come out recently. Each of them has come up with different numbers. And I appreciate, Mr. Chairman, your struggle to pin down more precisely both the size and the extent of the damage that has been caused over time, to both people and the environment, and the amount of money which is going to be necessary to clean it up. Because this confusion only holds us back from beginning a good portion of the work that we need to get under way.

I support an adequate national defense, of which the nuclear weapons production complex is an important element. But I am adamant that the cost of cleaning up Fernald is not a discretionary budget item that can be set aside or under-funded. As you, Mr. Chairman, have repeatedly declared, the amount set aside in President Reagan's 1989 budget for this cleanup is entirely inadequate. Environmental cleanup is a crucial and indispensable part of the cost of weapons production, and it must be given the same weight and priority that modernization and weapons production itself get.

The first step in making cleanup a priority is to determine the extent of the contamination. The Department of Energy still has not completed this critical step. Why not? I cannot give an answer to that. But until these investigations are complete, all estimates remain guesses. That is our immediate problem. When those investigations are complete and the costs known, we should proceed with a fixed schedule for change.

We understand that it will take more than 1 year or 5 years or 10 years to do this job, but we need a fixed schedule against which we work.

In addition, I would like to repeat my call for a panel of experts to monitor the cleanup, its cost and timing. The panel should meet the highest national standards, the kind evident in the Challenger review panel, which had a former Secretary of State, as well as leaders of undisputed independence and integrity, to look at the reality of the disaster, determine its causes and monitor its solution.

Such a panel is important because the costs of constructing new facilities clearly will compete with the escalating costs of cleanup. The Department of Energy must make cleanup as much a part of its mission as production, and it must offer a coherent plan for dealing with what is fast becoming the Nation's most costly clean-up project.

Finally, we must make certain that the Department of Energy facilities are subject to the same EPA standards as the private sector and to NIOSH inspections. We owe it to the men and women who work there; we owe it to the men and women who live in the neighborhood of these facilities.

Other governors share my frustration about the lack of knowledge as well as the lack of a governmental commitment to and understanding of the problems. In a demonstration of unity on these issues, I joined with Governor Romer, Governor Andrus, and three additional colleagues in sending a letter yesterday to President Bush requesting that he work with the governors and Congress to come up with a plan for timely cleanup of these sites.

In the letter, you will see us ask for a comprehensive cleanup of Federal facilities—a partial cleanup is a contradiction in terms; the establishment of a cleanup schedule that will be adhered to; adequate funding for the job, and we certainly want to work with you and will support your efforts in the Congress to ensure adequate funding; an effective regulatory structure that clarifies the applicability of Federal and State environmental protection laws to Federal facilities, so that we do not have to be involved in drawn-out litigation, so that negotiations between States and the Federal Government can proceed expeditiously; oversight and accountability to assure that the plans are actually implemented; and, finally, the development of advanced cleanup technologies, something which is critically important where we think the Federal Government's leadership can be instrumental in our success.

A few weeks ago, an Energy Department official said that the complete cleanup of the Fernald site would not be economically or technologically feasible; that it might be necessary to clean up the most threatening problems at Fernald and leave the rest to time and nature.

After 37 years of service, the citizens of Ohio and of our Nation deserve better than this. I know, Mr. Chairman, that is your intention, and I am pleased to say that we in Ohio support your efforts every inch of the way.

Thank you very much.

Chairman GLENN. Thank you very much, Governor. One quick question: The letter you referred to that all the governors signed, is that included in your testimony? If not, I would like to have a copy so we can submit it as part of the record.

Governor CELESTE. I will submit a copy to you so we can include that as part of it.¹

Chairman GLENN. Mr. Shank, you are the Director of Ohio Environmental Protection Agency. Do you have any remarks to add to the governor's comments?

Mr. SHANK. No, not at this time, Senator.

Chairman GLENN. Thank you.

Governor Andrus, would you proceed?

Governor ANDRUS. Mr. Chairman, good morning. I will condense my written testimony for the sake of time.

Chairman GLENN. Your entire statement will be included in the record.

Governor ANDRUS. Thank you, sir.

I do appreciate your interest, your invitation for us to be here before you this morning to give us the opportunity. I would point out that I have a copy of the letter that my colleague referred to. We will see that it is provided for the record.

Mr. Chair, members of the Committee, I appreciate the opportunity to appear before you today to discuss several issues that are of critical importance to the people of Idaho and to the Nation.

First, by way of background, let me say that for nearly 40 years, the State of Idaho has participated with the Federal Government in the research and the development on the Idaho National Engineering Laboratory, which is a vast reservation in our State between Idaho Falls and Arco, Idaho. It has been a very important ingredient of the overall research and development and safety practices of the nuclear industry within America. It has an international reputation. It also is very important to our national security. It is an important economic ingredient within our State in that there are more than 10,000 Idahoans that are employed in, on, and around the site. It contributes to our annual economy, and it also has been the designated preference site for additional DOE projects.

It has a tremendous future, but that future, Mr. Chairman, can only be assured if serious concerns about the past and present waste management are addressed in a responsible fashion.

I would say that we, like Governor Celeste has pointed out, your State and others, we have been good Americans; we have been good citizens in participating in the nuclear industry within this country. We have been willing for more than 20 years to do our part in the so-called "temporary" storage of transuranic and low-level waste that has been generated at some of the other sites across this Nation. We have accepted this "temporary" assignment with the full understanding that this waste would be removed to a permanent repository. Now, we have accumulated more than 2.4 million cubic feet of waste stored above ground, and there is other below ground which I will refer to in a moment.

As a matter of fact, in 1973, I was promised by the Atomic Energy Commission that the waste would be removed from our State by the end of the decade of the 1970's. It was not.

¹ See p. 316.

We were then told that a WIPP site would be located and it would be removed by about 1983. It was not.

Then we were told that the site at Carlsbad had been selected, and they would start receiving waste from our site on October 1 of 1988. It was not.

So on October 19, 1988, I informed then-Secretary of Energy, John Herrington, that from that date forward the borders of the State of Idaho would, in fact, be closed to any transuranic and low-level waste shipments destined for Idaho for storage. Those borders are still closed, Mr. Chairman. And I think that the 120,000 barrels and 11,000 boxes of waste that is stored above ground is enough for the State of Idaho to agree to accept until DOE and other States fulfill their responsibility.

We have been good American citizens. We are concerned about the national security. But we have been lied to for the last time.

I would say to you that we have to recognize that, as a Nation, if we cannot find safe and environmentally acceptable means of storing the waste that is generated within this country, then we ought to stop generating the waste. It is a position that many people will find acceptable, but I think there is a point in time, Mr. Chairman, when we, the States, the citizens, and the Congress will have to act.

I can only hope that the new Secretary of Energy, our new President, you, sir, as a member of the United States Senate and Chairman of this very important Committee, will impress upon your colleagues that we do have to devote the resources to the back end of the cycle as well as the front end of the cycle, as my colleague outlined a moment ago. It seems that all of the sex appeal and the desire of the gigantic industry have been on the creation of products from the front end. And I would say to you that the back end of the cycle is very, very important.

Now, just briefly, I alluded, Mr. Chairman, to the 2.4 million cubic feet of waste stored above ground. Now, I do not classify that as time bomb ticking. The integrity is good. The control is good. We have plenty of adequate monitoring. But we do want that to be moved to another site.

But we have below ground an equal amount or more waste that was buried during the 1950's and the 1960's in an indiscriminate fashion throughout that desert with the utilization of a bulldozer and a trench and sand over the top. That is a very, very strong threat to the integrity of my State and the aquifer above which it is stored. It is essential that the DOE and the Congress remove that material and bring it above ground, put it into the proper containers, and then move it to a safe site along with the other.

I would close by just saying, Mr. Chairman, that I leave you with several specific recommendations that I believe will go a long way towards properly assessing the concerns that I have outlined this morning.

First, it is essential that Congress engage in a responsible and aggressive oversight of all aspects of DOE's waste management. I think your oversight is critical to this.

Two, it is essential that the Congress address in this session the necessary legislation to facilitate the opening of the WIPP site at Carlsbad, New Mexico.

Three, it is essential, Mr. Chairman, that the necessary resources are made available for cleanup of the waste problems at DOE facilities across America. The administration and the Congress must confront this issue squarely, and it must be done in this session of the Congress.

Four, it is essential that we acknowledge the fundamental truth that I mentioned to you earlier, Mr. Chairman. If waste material is going to be generated, we must have a workable plan for its disposal. We simply cannot generate it and shrug our shoulders and say, Well, it will be taken care of somehow.

Thank you very much, Mr. Chairman. I would be happy to respond to any questions.

Chairman GLENN. Thank you, Governor. I appreciate it.

Governor Romer, we appreciate your being here this morning. This was in no particular order meant to prioritize governors' concerns here this morning. It is just the way it happened to come out.

Governor ROMER. Seniority, Mr. Chairman. Seniority.

Listen, it is in the right order. It reminds me of one those child games where you are given the ball, and the last one holding the ball has got the problem. And I got the problem. You came at this in exactly the right order.

Chairman GLENN. Now we are getting to the major leagues. [Laughter.]

Governor ROMER. Well, let me say, Senator Glenn, I would like to have some time to comment on the 2010 plan also, in addition to this short-term storage problem, and on the cleanup. But let me concentrate my remarks where Governor Andrus left off; that is, time. There is a clock ticking on the national security of this country. And I want to put a spotlight on it.

Rocky Flats is a plant that is critical to national security. As Governor Andrus has so well indicated, if we cannot dispose of this, we cannot produce this waste. As we all know, Rocky Flats is the main producer of the waste that Governor Andrus is storing. And I respect him strongly, and with his record dealing with this matter, I understand his saying: Take action or no more into this State.

Now, unfortunately, that left me with the problem in Denver. Now, I have one other unique fact: This facility in Colorado is located right in the middle of 1.5 million people. I think you know the attitude of Colorado citizens about that matter. It is my responsibility to be sure that it is safe and also to convince them that it is safe.

Now, there is a way in which we can work through this problem, but it requires the following kind of action. When that boxcar began to float back from Idaho to Colorado, it hit the Denver rail yards about midnight on Sunday. At 9 o'clock Monday, I had it back at Rocky Flats, and I went out personally and began kicking its tires because I had to defend to that area that it was safe.

You know, that boxcar, frankly, is an old weapons carrier, and it has got armor plate a half-inch thick. It is the safest place you could put barrels of waste. I said keep it there, do not unload it.

Now, in addition, I said to the Department of Energy: You can fill some more. You got seven of them? Fill them up. Just spread them out so that I do not have a 747 fall in the middle of all of

them at one time because the danger there is a maximum credible accident of a fire.

So I say that to you first, saying that I am trying to be responsible. Colorado, like Idaho, like Ohio, wants to be a part of this national union. But I said at the same time you cannot expand the storage of this waste on this site. This is a production facility. We have traditionally had 1,600 cubic yards that you could store here. And so I said fine, keep the boxcar, you can load some more boxcars up, but you cannot expand beyond the limit of 1,600 cubic yards. I gave DOE that very firm message months ago, and I said you must find a solution or this plant is not going to produce.

Now, that is the spotlight I want to put on this morning. We must find a solution to that problem by May, or we will not be in production in Rocky Flats. And I do not want that to happen, and there is a way to avoid that. I want to talk about it.

We had kind of a summit conference in Salt Lake City, Governor Andrus, Governor Corruthers, myself, and the Department of Energy. What we have to do is the following: We need to get a permanent storage repository. I believe WIPP is that depository. You may want to in the question period talk about WIPP. I personally inspected it. I know Governor Andrus has, and that salt mine has a very unusual feature which is good for storage of this waste. It is something I did not learn until I visited it, and that is: Salt is plastic. If you dig a cavern this size, you fill it back with loose salt, the pressure in that mine 2,000 foot underneath the ground will eventually crush those barrels. That salt will go around that material, and a thousand years from now, if you dug it up, it will be like a fossilized fish. It will be encased in salt.

I think that ultimately is a safe facility. We need to get WIPP open and on line. And there are some things that have to happen in Congress very quickly to get that done. But before WIPP is opened, we have got a short-term problem of what do we do with this waste.

Now, at Salt Lake, I clearly said I will work with you, but I cannot expand that storage in the middle of a metropolitan area. Governor Andrus clearly communicated what his conditions were. Certain things had to happen, and he indicated at that time that if the Department of Energy and if Congress did certain things, that he would reconsider his position in January, or after the first of the year. And I respect Governor Andrus in that regard. He did not say what he would do, and I respect that also. But I think what he is saying is that: I have got to have movement on this, or else you cannot use Idaho as a part of the solution of the Rocky Flats problem.

I then turned to the Department of Energy and said: You have got to give me a second alternative. And I think they are working on it.

But, Senator Glenn, this is something Congress must address immediately, because I am trying to warn everybody. We have got a crisis that involves national security about to happen if we do not find a way to get rid of that waste.

I also will say one other thing. I said to the Department of Energy, and I will repeat it today: I do not believe in people who say "Not in my back yard." I will say this to you and to the Presi-

dent of the United States, you get all of us governors in a room and you say, Look, we each got to take a piece of this action for a temporary period of time. I will find a way to store some of that somewhere outside of a metropolitan area in Colorado, make that pledge to you. But I cannot do it alone. Otherwise, all of us, politically, cannot become the dump of last resort for the Department of Energy.

Let me turn to the 2010 plan. I am concerned about the 2010 plan. I know we need to clean it up, and we need to spend the money to clean it up. We have got to find a way to fund it. But what concerns me about the 2010 plan is the cost.

You know, this Nation's threat, the threat to this Nation's security, is not just nuclear; it is economic. And I would suggest to you and other members of the Senate and the Congress that we are at a time in the history of this country that we need to seriously reconsider the cost, the cost to this Nation of continual nuclear build-up.

I think simultaneous to the 2010 plan as now written, we ought to have an alternate plan which would cost out what we might be able to do if we were to take successful steps in strategic arms reduction. Because I really want to warn everybody in this room. The cost of dealing environmentally correctly with this type of weapons production is very, very expensive.

I think that there is a time now that this Nation needs to reassess what its fundamental threat is, whether it is the problem of some nation having a military advantage or whether it is a multitude of nations having an economic advantage. I am seriously concerned as I price out 2010.

Let me say specifically, if I am informed correctly, the cleanup costs on that plan is \$81 billion. And if you take the annual cost of this weapons production, it is \$8 or \$9 billion a year. You take that over the 20-year period of that 2010 plan, and you come up to a quarter of a trillion dollars.

Senator Glenn, we ought not be debating the question of the 2010 plan alone and in isolation. We should have simultaneously on the table what other options are available to us, both in terms of strategic balance of power and the economic balance of power. I think that too long we have approached this problem of, hey, more is better. And I really am concerned as I look at the threat to this Nation's economy in terms of the cost of our pursuing the nuclear deterrence policies we have.

Finally, on cleanup. If you look at the environmental study, you will find at the top of the list is Rocky Flats. It does not make a governor of Colorado very happy. I want to work with you and with my fellow governors and with the Department of Energy to accelerate this cleanup. We have to do that. We cannot talk about national sacrifice zones. We have got to talk about national cleanup zones. The hair on the back of my neck just comes straight out when I hear somebody talk about, Well, look, we just got to put an iron fence or a concrete fence around some pieces of this country and say, whoops, that was a sacrifice to this Nation's defense.

We have to go back and clean this mess up. We cannot have a double standard. We cannot say to the private sector of this country you are going to not only protect the environment in the future

but clean up what you have done in the past, and not have the same standard for the Federal Government.

I would be happy to go back through those three items of short-term storage, the 2010 plan, and the cleanup with specific questions. Thank you.

Chairman GLENN. Thank you very much, all of you, for your excellent testimony. We appreciate your being here for this today.

You mentioned the prioritization report. Back to you, Governor Celeste. Have you had a chance to look at that and the findings of that? Do you agree with it?

Governor CELESTE. Mr. Chairman, it is very difficult for me to agree completely with the prioritization report in the sense as it looks at the facilities in Ohio. We feel that there are significant—if I understand the report that you mean, it seemed to rank Fernald as behind several other facilities in importance for cleanup. And I do not think that that fully takes into account the problems that we have at Fernald.

It is difficult for me to assess our problems relative to those at Rocky Flats or in Idaho or in other facilities, the situation in Washington. My hope is that there is a cleanup plan, rather than to talk about priorities that there is a cleanup plan with a timetable for each facility, and with funds allocated annually to the work at each facility so that we can see that progress.

I know that, as governors, we realize that none of this will be done overnight. But lacking evidence of determination, long-term commitment, and a strategy to make it work, I think all of us really want to take steps such as have been taken in Idaho and Colorado to ensure that there is real movement by the Department of Energy.

Chairman GLENN. There has been some movement in the providing of information. The 2010 Report was a plan that we had asked for; they had it in preparation. We asked specifically for the cleanup plan that resulted in what has been called the December Report. There are two volumes of that; one that stated the overall problem, and then No. 2 that tried to take a site-by-site-by-site study all over the country and say what had to be done at those areas. And we have a prioritization report, and we are trying to get as much information as we can.

As the Department of Energy is now willing to admit, I think, there was a lot of stonewalling going on for several years on that. It has taken us almost 4 years to get those reports going, even in the incomplete form we find them today. So we are continuing to push to get more information.

I also was concerned, to relate back to Fernald here while we are talking to you, Governor Celeste. What is your assessment of the Fernald dose reconstruction study? Have you had a chance to look at that? Because we had some additional testimony on that yesterday that was very disturbing to me.

Governor CELESTE. Mr. Chairman, our preliminary reaction to the dose reconstruction study, as we see it now, is that we are dealing with estimates of exposure of local citizens based on data that is—to describe it as soft is probably to be kind to it. It has been elusive. And I think that the thrust of that effort is in absolutely the right direction. Your insistence that the Department of Energy

come up with data that could be used, then, by CDC or others to give us a better evaluation is vitally important.

I am simply concerned about the base information we use in that study and the range of estimates. The values used now are only estimates, and I would hope that we do not find more information a few months down the road that will take us back to the beginning on that.

Chairman GLENN. Just for those who were not here at the hearing yesterday, what we have done in the past, we asked for the Centers for Disease Control to come in and do some studies as to what the actual danger has been at Fernald. We have a generation of people that have grown up down wind of the plant, and that is not unusual. Other areas of the country have the same thing. We happened to be concentrating on Ohio with that particular request, because we had people in the area who say the incidence of cancer has been up. Their children have had additional problems, for example there have been thyroid problems, things that go along with some of the radiation difficulties and others.

So they said, well, the Centers for Disease Control would be glad to do that, but they had to have all the estimates of the dose that has come out of that plant through the years. So we asked for that information. We were told that that has been in preparation for about the last 3 years now, if I am not mistaken. And the Centers for Disease Control has not done their studies because of that.

Now, we had testimony yesterday that was as disturbing to me as anything that happened yesterday, I guess, that we are not going to have the dose reconstruction study. That the records are not complete enough that they are going to even be usable. After all this delay.

And so we have the people around the Fernald area now who I have been telling all these years, depending on what information I was given that a dose study is being completed. Now we have to go tell them that, no, we are not going to have that study, at least not on the same basis upon which it was originally supposed to be developed. We have results on people, live, honest-to-goodness, walking, breathing human beings in that area. We can do an empirical study and find out if there are difficulties in that area down wind of the plant, more difficulties than a comparable population elsewhere, and just use empirical data if we do not have the dose study that we were promised.

That was very disturbing, and we have to follow through on that. We are in the process of making some contacts with CDC now to see whether there is not something we can work out on this yet.

Governor Romer, Governor Andrus, I do not know what your experience has been along that same line, but just getting information has been a very difficult problem. Do you have any comment in that area, Governor Andrus?

Governor ANDRUS. Mr. Chairman, I would like to comment on that. First of all, Senator, I have served in the Executive Branch and the Legislative Branch of Government, and I would say the Executive Branch has more control to solve this problem. I would find that somebody's job security should come to an end, and the people who did not keep their word should not just simply be patted on the head and forgiven. Somewhere, somebody has to be accountable,

and I would say to you that the only way to get their attention is exactly what I am doing in Idaho right now. Grasp them and their minds will follow, and their billfolds, too, I hope, Senator.

But I would not put up with it. I would not put up with it in my State, and I do not think the Federal Government has to put up with it.

Let me say one thing with reference to cost. We should not spend too much time—I know you cannot ignore it—on what the cost of cleanup will be, because in the desert in Idaho, that amount that has been buried out there has to be cleaned up. I really do not know whether that cost is going to be a million dollars or a billion dollars. But whatever the cost is, we are going to have to pay it.

Chairman GLENN. And it is not going to get cheaper.

Governor ANDRUS. It is not going to get any cheaper, and the integrity of the containers is important at this point in time. And the sooner we get to it, the better off. But I would oppose what I heard Senator Brock Adams, my former colleague, say here earlier about raiding the highway trust fund for money to pay for this. It is two different problems, and let us not destroy the bridges and highways of this country in order to solve it in that regard.

Chairman GLENN. With regard to WIPP, you both commented about the WIPP facility and couldn't we get ahead with that. There is some problem with the WIPP facility that they are studying right now. I thought Senator Bingaman might be here this morning. I know he has another commitment over on the Armed Services Committee with some of the confirmation hearings that we are going through. So I am sorry he cannot be here because I know he feels very strongly about WIPP and some of the problems and not moving ahead there until we have some of those problems better in hand. So it is a difficult problem all the way around.

Governor Romer talked about the cost of environmental restoration. We had testimony on that yesterday, and it is going to be an enormous cost. It is going to be over a 20- to 30-year period. We are talking about figures to do the whole job of upgrading and cleanup and everything of somewhere around \$240 to \$250 billion over, say, a 20- to 30-year period. So it is going to be an enormous expense.

Every time we have had an estimate on this, as I pointed out yesterday, the cost has gone up not down. So I doubt that the estimates are going to get any lower. And those estimates were made by not only DOE but by GAO's independent look also. So it is going to be a very expensive thing to take care of.

The Department has proposed an administrative land withdrawal instead of some of the proposed legislation now before Congress to overcome the obstacles to starting up WIPP. Governor Romer, you talked about that. What is your feeling, Governor Andrus?

Governor ANDRUS. I have no confidence in the Legislative Branch of Government completing the legislative land withdrawal. I think the State of New Mexico has accepted almost \$1 billion of taxpayers' revenue to complete that site. I have looked at it, as Governor Romer has; I have listened to all the experts and the scientists on both sides of the issue. I think we ought to proceed, Senator.

If the administrative land withdrawal should move along speedily, the provision that is in it says that it will not be enacted until

this session of the Congress has adjourned. But there will be none of the additional \$250 million of goodies in it for the State of New Mexico in an administrative land withdrawal. But those goodies are—and I support them and they should be—in the legislative land withdrawal.

Hopefully, they will proceed on that line, but we cannot be held up again by their lack of action.

Chairman GLENN. Governor Celeste, do you have any comments on that?

Governor CELESTE. No, Mr. Chairman.

Chairman GLENN. Do any of you have ideas on the long-term cleanup spending mechanism that we might be able to set up? I have been very concerned that we do something I do not know quite what it should be but we are probably going to establish some sort of fund, so we know that once we start on this job, it continues year in, year out.

The worst and most wasteful approach we could take is to provide big money one year, no money the next; big money next year, no money the next, as we respond to budget priorities year in, year out. And we cannot do it that way.

Do you have any suggestions in that area, any of you?

Governor CELESTE. Mr. Chairman, my view of this is we are talking about the cost of the production of these weapons. It should have been treated as part of the cost in the first instance. We now have created, because we purchased weapons really cheap in the sense that we were not investing in the safety and environmental protection that was necessary during the production process for 35 years. That ought to be viewed as part of the cost in the future, and that, to some degree—and I am quite interested in Senator Adams' notion of a trust fund. But to some degree, the funds committed to this ought to represent an agreement that a minimum of a certain percentage of the cost of all future production will itself be devoted to safety and cleanup, safety for current operations and cleanup of past problems.

I recognize that that would increase the cost of either modernization of existing weapons systems or of new systems being introduced, but it seems to me that is the only way you can set in place a predictable sum of money, and one that carries with it the kind of rational support of our citizens when we make a determination about what kind of a weapons systems we want or what level of weapons we want.

It may be 40 percent of the cost of production should be dedicated to a trust fund, not all of which could be spent that year. We know that in Year 1, given the nature of plans and technologies, we may not be able to spend all of the money we generated for this purpose. But setting it aside in a trust fund would allow us to say that these resources shall be available over the long term for this purpose.

Chairman GLENN. Any other comments? Governor Romer?

Governor ROMER. I agree with that. I think that you need to put the costs of this into the Department of Defense budget. This is why I am concerned about, just in isolation, that 2010 plan that talks about replacement of these facilities over the long haul, be-

cause we need to cost out what the ultimate costs of our defense policy is.

Chairman GLENN. How would you do that? Would that be an add-on to our defense budget, to normal defense budgeting?

Here is the problem: I favor a strong defense, as I am sure everyone does. We need the tritium production. We need a lot of things in defense. Hopefully, we are getting control over some of the excesses in defense spending.

Now, the first responsibility of Government is to keep our people alive and independent and free. And we want a defense that provides that, but we do not have extra money there; at least theoretically we do not.

Now, if you just say that we are going to take it out defense's hide at \$8, \$12 billion a year, that, in effect, comes out of other programs we really truly do need for defense. So how do we do that? It would seem to me that maybe we would have this as a set-aside fund. You do not just say, okay, whatever the defense budget was for this year, you would have to absorb it over there because of past difficulties.

We have certain international requirements. The defense of the country is not something that we just put up because we like to play little games. It is very much for real. So I cannot see just saying, well, defense, we are going to spend this much this year; but, oh, yes, we forgot to tell you, take \$12 billion out of there for cleanup.

Governor ROMER. Senator, I feel that you are going to have to enlarge the defense budget to do this in the short run. But I do think that it ought to be on the table of calculation. When we are trying to strategically calculate what it costs to defend this country, this is a true cost, and it ought to be added in.

Governor ANDRUS. Senator, I would just add to that that we agree with your personal assessment that you cannot diminish our military strength in this. But I think it should clearly be an add-on at the front end of the budget process, that it be set aside in trust for that purpose. But it should not come out of the hide of.

Chairman GLENN. And, hopefully make it constant so we know what we can plan on each year.

Governor ANDRUS. That is right.

Chairman GLENN. So we can run programs that are halfway efficient in doing what has to be done.

Governor ROMER. Senator, could I add one more thing?

Chairman GLENN. Sure.

Governor ROMER. My testimony, however, is calling in question—calling in question—the amount of resources that this Nation is placing into its strategic defense posture in reference to the threat it has economically. And I do believe, as I see the conditions in the world changing, particularly in Russia, there is obviously a climate in that nation that they also are realizing that their values—different than ours in some ways—but their values are not well put in place by the commitment they have to their own defense and strategic defense posture.

Therefore, we need to get the people who are making the decisions budgetarily in this weapons production to thinking through alternate 2010 plans which can be reduced in cost multilaterally,

not unilaterally. Because I think that we may well dig ourselves into a hole thinking that, sure, the first and primary order of this country is to defend its citizens. But that warfare out there is changing from military to economic, and I think we are not paying sufficient attention to it.

Chairman GLENN. I do not disagree with you at all.

Governor CELESTE. Mr. Chairman, I would like to make one other point in terms of the money we spend on cleanup. I think that it is very important that we have a dedicated amount of money to research and technology that focuses on cleanup. Clearly, the generation of this waste and how we manage and dispose of it has been an area where we have postponed a day of reckoning for a very long time. And one of the ways in which we can conceivably reduce costs over the long term is by devoting more resources now and in the immediate future to the whole notion of the technology we use, both on the production side but also on the waste management side. I would suggest that that is a place where substantial additional resources ought to be committed.

Chairman GLENN. Thank you.

Do you all have compliance agreements? We have the one in Ohio that Tony Celebrezze, our Attorney General, will talk about in a few minutes. Do you have compliance agreements worked out, Governor Romer?

Governor ROMER. Yes, we do.

Chairman GLENN. Are those satisfactory? Do you need those expanded? What is the status of those?

Governor ROMER. Well, as you know, there have been a lot of mistakes made in the past. There has been a lot of difficulty getting adequate information and accurate information and responsiveness from DOE. I find DOE in the present period of time genuinely trying to work with us in Colorado. The problem is money.

Our compliance does not go after an accelerated cleanup nearly in the time frame that we need to go at it. So my main focus with DOE right now is—you know, I do not have the size of cleanup that some other States have, but I have some that is of the highest priority because of the potential danger to people. And we need to have some budgetary acceleration on cleanup, and our compliance, technically, is working better. But we do not have enough funds to implement the cleanup that needs to be done.

Chairman GLENN. Is that basically your situation, too, Governor Andrus?

Governor ANDRUS. Yes. We have ongoing compliance negotiations under way right now. I would say that on the INEL, the DOE has worked with us very, very well. The personnel out there have no complaint with it. But what my colleagues have said is true about the amount of money available.

Chairman GLENN. Just one other question on this, and this involves sovereign immunity. In hearings in 1987 and since then, major concerns have been raised with respect to the Government's exercise of sovereign immunity, a principle which allows Government to avoid liability for civil penalties resulting from non-compliance with environmental laws. Shouldn't the Government be subject to the same enforcement measures as the private sector?

Governor CELESTE. I agree, Mr. Chairman, and I think that the point that Senator Metzenbaum made earlier is a good one. There is a real concern if the Government tries to take its protective shield and throw it around private contractors as well. And I think that that raises a real serious concern about how we encourage accountability anywhere in this system.

Chairman GLENN. Thank you.

Mr. Shank, you have sat there very patiently. Do you have anything to add to the learned discussion of the governors here?

Mr. SHANK. Thank you, Mr. Chairman. I think the three governors have done an excellent job in presenting the problems that the States face in dealing with the Department of Energy and their inadequate response. As such, I really do not have anything that I would like to add right now.

Chairman GLENN. Good. Thank you very much.

Thank you gentlemen. We appreciate it. And I hope you will be responsive to any questions that other Committee members might wish to submit to you that we could have your replies back and include that in the record. I appreciate your arranging to be here this morning. Thank you very much.

Governor ROMER. Thank you.

Governor CELESTE. Thank you.

Governor ANDRUS. Thank you.

Chairman GLENN. Our next witness on Panel 2, is the Honorable Anthony J. Celebrezze, Attorney General, State of Ohio, who, as I indicated earlier, has concluded what we think is a landmark, environmental compliance and cleanup agreement with the Federal Government on the Fernald Facility. We think that this agreement will probably set the pattern that other States will follow in the future.

Mr. Attorney General, if you would go ahead with your testimony. If you wish to summarize your testimony, that would be welcome since we have a lot of witnesses. In any event, your entire statement will be included in the record, and we appreciate your coming in this morning.

TESTIMONY OF ANTHONY J. CELEBREZZE, ATTORNEY GENERAL, STATE OF OHIO

Mr. CELEBREZZE. Thank you, Mr. Chairman. I appreciate the opportunity to be here this morning and share some thoughts and to commend you for taking on the job and the responsibility of making the Department of Energy accountable.

I was asked to address a number of different aspects. I have submitted written testimony that is much more lengthy than the comments that I am making today.¹

Let me start out by giving you my comments on the documents, the 2010, the dose reconstruction, and some of the Department of Energy budget items, and then update you on the status of our efforts in Ohio to clean up the Federal facilities there. I will start off by saying that the Department of Energy has made significant progress. Since we first tackled them 5 years ago, we have seen a

¹ See p. 234.

measurable change in their attitude. They signed two landmark consent decrees with the State of Ohio over Fernald, and we have gotten a commitment for a similar decree covering the facility of Piketon, Ohio. We think the agency is on the road to positive change. We welcome that new attitude.

However, during the early stages of this new attitude on their part, in their transition to responsibility, I think that healthy skepticism and a good degree of cynicism is still the order. I recognize that our knowledge of how to detect and rectify environmental pollution is still somewhat limited, particularly when we deal with radioactive waste. We also have to remember that the Department of Energy for far too long has been allowed to operate in the vacuum of its own conscience, being the judge, prosecutor and jury on situations involving environmental problems. I can bear witness to the effects of that type of arrogance on their part.

The preliminary reports that have been submitted by the department, which seem to sketch only the outlines of problems, I think have to be scrutinized very carefully. The prioritization report lacks significant data on environmental risks that are posed by their facilities. Also, it ranks only the risks associated with each identified source on a site, but does not get into the risk posed by the site as a whole. This is a little bit like evaluating a symphony orchestra on the performance of its celloists or its violinists or its viola section. They do not get into the impact of the site as a whole.

They have to compile more complete information, and I think they have to re-evaluate their rankings before funding can be adequately prioritized for these cleanups.

The dose reconstruction study suffers from similar difficulties. They were crippled by sloppy record-keeping practices from 20 and 30 years ago. We have been inundated now by new information that indicates that actual releases were many times greater than officially reported, so the department is unable to make accurate estimates of the total releases of uranium and other radionuclides.

The whole study will be questionable unless the agency can provide a more accurate portrait of all of the releases that have taken place.

The environmental safety and health needs assessments of the 45 specific sites, including the three in Ohio, estimate that the total environmental budget should be between \$53.4 billion and \$91.7 billion. Remedial action or assessment and cleanup of past contamination alone, which is believed necessary at 37 of those locations, is estimated to cost anywhere from \$35.4 billion to \$64.9 billion.

I think these figures sorely underestimate the actual costs because they do not include the cost of dealing with potential problems caused by off-site contamination.

Even with the potentially low estimates that have been given, DOE requests only a minimum of funding from Congress to address and abate the problems. For example, as a result of the extensive litigation over the Fernald site, the needs assessment report included some specific items for corrective action that were contained in the consent decrees that we negotiated with the department. The report estimated the total environmental need at the site at \$5 billion, of which nearly \$4 billion is dedicated to remedial action.

Their budget request for the site, however, is just \$106 million. This amount is not just for cleanup of past contamination, but also includes future compliance costs. I think that is clearly a very sorely inadequate amount of money.

I can understand that budget requests are preliminary until the site study is complete, but there are some things at Fernald that are obvious that need to be done right now. We do not need any more studies; we do not need to putz around any more. There are problems that need to be addressed, and funding should be requested immediately.

For example, the two K-65 silos which contain radioactive waste at Fernald—these go clear back to the Manhattan Project—are in poor physical condition. You could look at them and determine that they are in poor physical condition. These were the silos where we had a radon gas release 2 years ago that was the subject of one of our lawsuits against the Department of Energy.

I attribute no special significance, Senator, to the fact that your opponent was on the site at the time the radon gas was released.

Chairman GLENN. I had nothing to do with it. [Laughter.]

Mr. Celebrezze. I am concerned, though, that something that is as obvious as these two silos was not included in any kind of a budget to be addressed immediately. These silos, I feel, are in danger of falling down. If they do, we are going to have a cloud of nuclear gas over a fair amount of southwestern Ohio. I do not think there is any reason why they did not request specific money in the budget for that type of activity.

I am also concerned that they do not totally understand—and I am getting into the 2010 study now—the amount of money that is required to remediate the problems at all of their sites. The 2010 Report approximates that \$29 billion will be needed for cleanup and restoration of all Federal facilities in the next 20 years. That is a figure far below other departmental estimates on this subject.

I think the funds have to be guaranteed and sufficient dollars budgeted to immediately address the identified problems. And I think the trust fund concept is a very viable concept so that this money is there. It is guaranteed, it is sacrosanct for the cleanup and cannot be bled away into other projects or other parts of the Department of Energy budget. I think that is a viable way of addressing this, and we should establish that trust fund and set aside the funds needed for the cleanup so that we assure that the important work of cleanup remains at the top of the priority list no matter what happens to the operations at the site.

The 2010 study raises two additional questions. One is the report's proposal to shut down all nuclear materials activities at the Mound facility and to close Fernald completely.

According to the 2010 study, the Mound plant operates in a safe and environmentally acceptable manner, and appropriate modernization should allow the plant to continue that type of safe operation. It recommends, however, that all of the nuclear activities should be transferred, claiming that nearby population growth and public perception of risk is such that—and I am quoting—“even insignificant incidents involving nuclear materials may result in major impacts on production.” They have provided for a capital investment cost of over \$180 million, plus \$75 million for transitional

operating expenses for the transfer of the nuclear operations to another site.

It may be true that consolidating the activities could be more cost effective in the long term for the department. It is true that population density near the Mound facility has increased dramatically. But where in this country is it acceptable to operate an unsafe nuclear weapons plant? I could adopt a State's rights view here and point out that, yes, Ohioans do not want to be guinea pigs for the Department of Energy. But I do not think other States would appreciate that kind of jingoistic attitude either.

If the expenses to upgrade and operate the plant safely are less than the costs to move, and they would help to guarantee that the Department of Energy would drop their "let us just leave our mess behind" attitude, then I think they should invest in the existing facilities.

The same principle applies when reviewing their request to phase out all operations at Fernald by 1995. If their true intentions are simply to close the plant and duplicate its production process by creating a new facility elsewhere, I would object very strenuously to that kind of an attitude. This type of negligence—

Chairman GLENN. I might interrupt right there. That is not the intent that they express. The use of Fernald, the function it provides in the whole weapons process, there is just not that requirement on into the future. That is their theory. It is not something that is going to be moved from Fernald and put into a new facility some place else.

Mr. CELEBREZZE. If that is the fact, I cannot argue with it.

But I think what they have done, the Department of Energy, to our State of Ohio is very much similar to what happened in the steel industry. They built the plant; they operated it for 35 years without putting any money into modernization. They have created horrendous environmental problems at the plant. Now they want to close it and walk away. I just disagree with that. It affects the workers; it affects the communities; it affects the area that the plant operates in.

I do not think any State—Ohio or any other State—can afford that kind of callous treatment again.

I think that the Federal Government, particularly the Department of Energy, has a responsibility—the same thing we demand of the private sector, I think they have that same responsibility to our citizens.

The second question that is evoked by the 2010 study is the critical approach taken towards State agencies and the public who, according to the report, are not sensitive to the Department of Energy's budget constraints and nuclear deterrence requirements. It is true that the threat of nuclear exposure grates a raw nerve for most citizens, as does drinking contaminated water or digesting food poisoned by hazardous waste. That fear can turn into hysteria very easily, and I can totally understand that.

But I think that is all the more reason why the Department of Energy should commit itself to a cleanup and to displaying a more reasonable attitude in their response to some very difficult questions. Lawsuits by State agencies, cooperative work with concerned Federal officials like you, Senator Glenn, and organized citizens

groups are the only reason that Ohio has been able to attain the progress it has at the Fernald and the Piketon plants.

Kicking the public conscience suggests only that the department has not quite yet accepted what the true focus of the outside criticism really is—that is that we want better environmental, safety and health precautions at all of the existing facilities that they operate. To say that the cause of anything that they do is done because of public hysteria, I think begs the question. It is kind of like shooting the messenger, and we ought to address that in a very serious manner.

The details of our consent decrees with the Department I think are important as this Committee considers the policy questions and budgetary questions for Federal facilities. The decree requires the Fernald facility to comply with all State and Federal hazardous waste laws and to meet the proper ground water, surface water, and air pollution standards. In addition, the State now has the clear authority to regulate the treatment and disposal of mixed waste; that is, partial hazardous and partial radioactive waste at the Fernald facility.

A major provision of one of the consent decrees mandates that the department reimburse Ohio on an annual basis for the costs of overseeing site cleanup. Again, we are merely asking the same thing that we would ask of a private facility that we went after in the same kind of a way.

We can act as a watchdog as the agency implements the remedial investigation and the feasibility study. The payment of over a million dollars reimburses the State for the costs that have already been borne, and there is a part of that that is civil penalties that is being appealed up through the Federal courts.

I think that any of the camouflage techniques that the department has used in the past to lessen the public's call for accountability will not assist the department in meeting the new challenges that they have before them. I would again urge you and the Committee to clarify existing law and to remove the smokescreen of sovereign immunity that has been used by the Department of Justice and other Federal agencies to prevent accountability at Fernald and other sites like Fernald.

Due to the absence of Federal enforcement of the environmental laws against Federal agencies, the role of the States and their attorneys general in the enforcement of these laws against these agencies has become more and more important.

The Justice Department's efforts to avoid the imposition of sanctions against Federal agencies greatly undercuts the effectiveness of our efforts, and I think undercuts the goal of achieving cleanups and safe operation. There is still a lot to be done.

States do not have the authority yet to regulate nuclear waste, and that is the majority of the waste at the Fernald site. Although Ohio did gain the authority over mixed waste, it seems unlikely that the department would acquiesce their control over the nuclear waste issue, and even the mixed waste issue in every instance. A clear waiver of sovereign immunity is needed to assess civil penalties and to gain oversight authority over nuclear waste that is generated across the board by the Department of Energy.

Clarification of the extent of contamination and the dollars needed to abate the problems caused by the pollution is also necessary. This cleanup is going to take many years, and a long-term funding mechanism such as a trust fund I think is the way to go. But the funding should not be presented as a blank check. I think there is a very real need for proper oversight of the spending and the cleanups on the part of the department by Congress and, in our case, by the States.

I will finish as I started by saying I welcome the Energy Department's new attitude. They are demonstrating that they do want to make some progress in this area. But I also feel that a healthy dose of cynicism and skepticism is still in order here.

Senator Glenn, I commend you and the members of the Committee for undertaking a horrendous task.

Chairman GLENN. Thank you. I appreciate that. I, too, think that they are making a lot of progress. I think it took a long time for them to get sensitized but once it occurred, I think they have been forthcoming, and I think they have been trying to do a good job. I have been complimentary to recently departed Secretary Herrington for his efforts over the last couple of years in really trying to get a handle on these problems and really going to the mat and fighting for budgets where he lost out, obviously, in the Reagan budget.

We are hopeful that the new Office of Management and Budget under Mr. Darman, who was confirmed yesterday by the Senate after 2 days of hearings before this Committee, we are hoping that he and his colleagues will be more forthcoming with funding to really get started on some of this.

I gather that since the State's consent decree gives the State authority over mixtures of hazardous and radioactive waste, that you would probably favor a statute to clarify that mixed-waste issue, rather than just the agreement as it exists now. Is that correct?

Mr. CELEBREZZE. Absolutely. Mr. Chairman. We are one State out of 50. And in the negotiations with the Department of Energy, they made it very clear that they would consider each case on a case-by-case basis. So although we have achieved a consent decree, I think there still is a need for a statute that mandates that kind of authority on the part of the States.

Chairman GLENN. Your consent decree that was worked out over quite a period of time with a great deal of personal effort by you, and certainly by your staff, also, is looked at as a landmark consent decree that may well be copied by other States across the country.

What is the significance, the special significance of the State's watchdog role which was established by this consent decree?

Mr. CELEBREZZE. Mr. Chairman, I think that the consent decree—and I hope it contributes to the deliberations of this Committee—can act as sort of a new Federalism in getting at this problem, a cooperative effort between the States and the Federal Government.

First, the significance of the decree is that because the department will have to clean up any pollution it finds in the studies, and the State has the oversight authority, we get away from the fox

guarding the hen house concept of the way these facilities have been operated in the past.

Secondly, the State of Ohio and any other State have a tremendous amount to contribute in the way of knowledge of the environment in their own State. Our Ohio EPA has done an outstanding job of studying things. They have a tremendous base of knowledge already that can be brought to bear on these facilities. By giving the State the oversight ability, they can dovetail that and, I think, in the long run save money, at least on the studies.

Thirdly, in the case of Fernald, the extensive knowledge of the Ohio Environmental Protection Agency will save the Department of Energy from going off in the wrong direction. They have already had one instance of a uranium migration problem that they contracted out and did a study, and the consultant came back with the study and they botched it. The migration was going in the wrong direction in the study from where it really was going. Our EPA had that kind of information that we could have shared with them willingly. So I think there is a very clear significance in the State as a watchdog over the cleanup of these States.

The other factor, Mr. Chairman, is just that I as an elected official in the State of Ohio am a lot closer to the problem than the Department of Energy officials at a regional office or somewhere else. The citizens of that area hold us accountable for guaranteeing their health and safety, and the first place they reach out is to the State officials. It is not necessarily the Federal Department of Energy. That is incentive for the State to do a conscientious job in this watchdog role.

Chairman GLENN. How about the financing? Is that a factor? Are you able to take on that, or do you need the reimbursement from DOE?

Mr. CELEBREZZE. We need very badly the reimbursement from DOE. Again, I want to put this in the context of what we do when we go after a private facility. My goal in going after a private facility is getting the entities that were responsible for making the mess to pay for the cleanup. And that is all we are doing here.

The States do not have the resources to undertake this type of a cleanup. As Governor Celeste said a little bit earlier, these costs really should have been amortized over a period of years in the cost of defense or the cost of weapons. Since they were not, it is going to require a fairly intense slug of dollars to get this under way. But the States really do not have the wherewithal to do this.

Chairman GLENN. If there is that kind of close cooperation, while that is a very small percentage of the total project cost, you really may, in the long run, save DOE money for those three reasons you mentioned.

Mr. CELEBREZZE. I think we can save a great deal of money. Even with the civil penalties issue. If we had civil penalties in 1980, the Piketon facility would not be anywhere near as bad as it is right now, because we would have been able to go after them and assess civil penalties. Whether we want to admit it or not, those act as a deterrent. They act as a way of getting people to think about their conduct and maybe provide a little incentive to cooperate and act in a conscientious manner.

Chairman GLENN. The 2010 Report contends that operation of existing DOE plants has become more difficult due to differences in environmental standards established for the various States. What are your observations on that? Do you think that is correct?

Mr. CELEBREZZE. Mr. Chairman, in all States, the hazardous waste, the air pollution, and the water pollution programs meet the uniform components that are required by U.S. EPA regulations and are subject to U.S. EPA approval. The variances that may exist from State to State are minor compared to the overall policy—in other words, U.S. EPA really sets the policy in these types of laws and the enforcement.

So for the Department of Energy to say that it is the States that are causing the problem because of variances in their statutes I think is begging the question, and I think it is trying to point the finger somewhere where it should not go. They ought to look in a mirror. These are regulations that are imposed basically by the U.S. EPA, and we enforce them. The variances that Ohio puts into the law are not that significant.

This is necessary for uniformity of enforcement. That's why U.S. EPA has the overall oversight. Again, I go back to where we regulate private entity sectors. They need to have some assurance that there is some uniformity between States in our statutes. And by having the U.S. EPA as the overseer, they ensure that. But it is begging the question for Department of Energy to point the finger at the States and say that we are the cause of some of these problems.

Chairman GLENN. The 2010 study points out that necessity for prioritizing things since we do not have money enough to do everything at one time. I presume you would agree with that rather than just saying we have X dollars; we will divide it up by 45 sites, because some sites may be more of a hazard than other sites.

Do you agree with their decision on that?

Mr. CELEBREZZE. I think there need to be priorities set. I do not particularly agree with some of the ways that they have gone about setting the priorities. As I mention in my testimony, Mr. Chairman, they assess the impact of individual aspects of each site. They do not assess the impact of the total site, nor do they take into consideration off-site contamination.

I do not think that they should be able to use higher prioritization of the worst pollution as an excuse to ignore the remainder of the sites that are very serious. Some prioritization is going to be necessary, and it would be my hope that part of the process of prioritization is not whether a facility is operating or whether it is closed. There are some facilities that are closed, as the Fernald facility, or due to be closed, that I think deserve the highest priority.

Prioritization is necessary. The funding has to come from somewhere, and I realize that is the toughest problem of all. I think they ought to work a lot closer with the Congress and with the States in assessing what the prioritization is going to be.

Chairman GLENN. The 2010 study states also that due to adverse publicity and public scrutiny that some plants should be closed due to a public perception that nuclear weapons facilities are unsafe. I have a little trouble with that, but is this statement a fair assessment of public attitude? Do you think it has gotten to that, where

just the fact that there is a nuclear facility and there have been questions raised about it, that the plant should be closed or that that should be a major factor in closing the plant? What action do you think they should take to address this problem?

Mr. CELEBREZZE. I think it is more a problem of the Department of Energy's credibility. The fact is that some of these facilities are unsafe. In the Fernald facility, there are a number of drinking water wells that have been polluted and are unusable around the facility.

The guts of the problem is that basically the Department of Energy has given assurances for 35 years that things are okay. I read a column that you wrote, Senator, for the New York Times, where you note that there have been assurances given for 35 years that the operation at Fernald was safe. The fact is that it was not. And the fact is that the department tried to stonewall involving citizens in what the problems were.

Their refusal to comply with State laws and State regulations I think add to the problem. So the adverse publicity alone, I do not think, is responsible. Again, I think they are begging the question if they are saying it is only because of adverse publicity that they are thinking of moving a site or closing a site or doing something else. The fact is that many of these sites are unsafe. The fact is that many people have been lied to over the years. And the fact is that people do not trust them any more. But to move them or to do something based only on public opinion I think would be extremely short-sighted and extremely unfair, and really would not get to the base of the problem, which is to clean up the contamination.

Chairman GLENN. Yes, I agree with that.

One additional question, and this gets into little more of a legal area, perhaps, but you might want to comment on it or would be willing to comment on it. Your written testimony says that consent decrees, unlike compliance agreements, are enforceable. Dr. Porter of EPA, who we will have on in just a few minutes, in his testimony says that compliance agreements or inter-agency agreements are enforceable.

Could you comment on the difference of opinion on this?

Mr. CELEBREZZE. Mr. Chairman I would have to respectfully disagree. A consent decree is a court order that, if it is violated, triggers sanctions. The type of compliance decrees that the U.S. EPA is talking about, I have refused to sign off on. Because if that compliance agreement is violated, the only thing you can do is start the process of going into court to try and get something done about it.

So, in other words, at Fernald, essentially if we had merely a compliance agreement and it was violated today, we would go back to where we were in 1983 in trying to get something done about that.

A consent decree has sanctions built into it; it has penalties built into it. The only thing we have to go into Federal court for, if the consent decree is violated, is to trigger the sanctions, not to start the whole process again of what needs to be done or renegotiating, an agreement.

That is why I have to respectfully disagree with the U.S. EPA that these are enforceable agreements. They may be enforceable, but it is going to be 5 or 6 years down the line, after going through

everything that we have gone through to get to the point where we signed off on a consent decree.

Chairman GLENN. Dr. Porter may wish to respond to that.

We appreciate very much your being here. I hope that if there are questions from other members of the Committee who were not able to be here this morning, you will be willing to respond to them for the record.

Let me just say before you leave that you are to be complimented for your initiative and for taking this on there in Ohio. You took it on not through any request from anybody except your own concern about the people of Ohio. You mentioned a few moments ago citizens groups and those who are interested in this. I am sure we would find similar groups all over the country. One of the other people came in today not to testify but just because of interest in that area around Fernald. I talked to him just briefly before the hearing; Mr. David Day is representing the Atomic Trades Labor Council from down there in Fernald. We have groups in from all over the country similar to his interest in that area.

Mr. Day, are you still in the audience? I know he was here in the audience a few minutes ago. I guess he stepped out temporarily, but I know he was here earlier on in the hearing. I wanted to recognize that he was here. I know you have worked closely with him and his group down there and represent the concerns of the people in that area. You are to be complimented for the excellent initiative you have taken.

Mr. CELEBREZZE. Thank you, Mr. Chairman.

Chairman GLENN. Also, you have testified before. I have told other States—I know you do not feel that you need extra business in Ohio in conducting your office, but I have said that other States should get in touch with you because your work in this area has been pointed out as a model of what we thought other States could also do, or adapt to their particular situation. So we will also point that out once again today; that any other States that have interest in looking at the model that you have set up, I am sure you would be glad to talk with them.

Mr. CELEBREZZE. We would be happy to share, Mr. Chairman.

Chairman GLENN. Thank you.

Mr. CELEBREZZE. Mr. Chairman, the record should also show that your leadership was a key in the Fernald and the Piketon sites.

Chairman GLENN. Thank you.

Our next panel is the Environmental Protection Agency, Dr. J. Winston Porter, who is the Assistant Administrator for Solid Wastes and Emergency Response, accompanied by Christopher Grundler, Director of Federal Facilities Hazardous Waste Compliance Office; and Richard Sanderson, Office of Federal Activities.

We welcome you this morning. Dr. Porter, we look forward to your testimony this morning. We appreciate your being here.

TESTIMONY OF J. WINSTON PORTER, PH.D., ASSISTANT ADMINISTRATOR FOR SOLID WASTES AND EMERGENCY RESPONSE, ENVIRONMENTAL PROTECTION AGENCY,¹ ACCOMPANIED BY CHRISTOPHER GRUNDLER, DIRECTOR, FEDERAL FACILITIES HAZARDOUS WASTE COMPLIANCE OFFICE, RICHARD SANDERSON, DIRECTOR, OFFICE OF FEDERAL ACTIVITIES, AND LISA K. FRIEDMAN, ASSOCIATE GENERAL COUNSEL

Dr. PORTER. Thank you, Mr. Chairman.

I also have with me Lisa Friedman from our general counsel's office, in addition to Chris Grundler and Dick Sanderson.

Mr. Chairman, today I would like to give you an overview, from EPA's standpoint, on the status of Federal facility compliance. I want to also make about five or six practical suggestions or recommendations toward the end of my testimony on how to improve compliance of Federal facilities.

We have spent a lot of time on compliance issues over the last few years. I have testified before this Committee and others on several occasions. Again, I want to commend you for your leadership. I think we have made real progress. I have seen a change in attitude also in DOE the last couple of years. I think you have raised all the right issues, and we should focus on those and move ahead.

Let me first talk to you about where I think we are. It is important to realize, as you certainly do, that the nuclear weapons complex is made up of 16 major facilities. It is not 800 or 8,000. It is 16 major facilities. We are going to need to have strong plans in place at each one of those 16 facilities. I will talk about that in a minute.

Chairman GLENN. How many separate sites are there? The figure that I keep using and that I think has been published is 45 sites. The figure I have used was 17 major sites, 45 facilities in 12 States. Is that correct?

Dr. PORTER. That is about right, yes, sir. It depends a little on how you count. There are 16 or 17 what I call majors, the Fernalds and places like that. There are a number of other laboratories and so forth. There are thousands of individual contaminated sites at those individual facilities. But the reservations we are talking about are on the order of 16, at least the major ones that I want to talk about today.

I have spent a lot of time going over the DOE program in response to your request for this hearing. I would like to give you some of my perceptions of where I think we are.

First, as you are aware, their program is a complicated one because they are doing a lot of ongoing operations for nuclear weapons production. They are doing a lot of so-called modernization which has environmental overtones, also, but it is a separate budget item. Within the environmental safety and health area, there are about 5 or 6 individual breakdowns, and I will not go into detail because you probably covered this yesterday. But there is a so-called base program which is the day-to-day management of the environmental water treatment plants and things of that nature. There is so-called corrective action, which are discrete upgrades to bring those facilities into kind of what I call day-to-day compliance

¹ See p. 249 for Dr. Porter's prepared statement.

with environmental regulations. There are a number of special radioactive waste projects, such as the vitrification plants to be built at Hanford and Savannah River. These are all multi-billion dollar activities.

Next, there is something called decontamination and de-commissioning—for example, some of the Hanford reactors—which would be, again, billions of dollars to decontaminate and de-commission those facilities over some period of time.

Finally, and what I really want to talk about today, is the clean-up situation. The \$30 to \$60 billion they talk about in their various reports is for the cleanup of past practice units; that is, things which have been buried in the past, not ongoing activities.

I wanted to set the stage a little bit, Mr. Chairman, with those five or six items, because I think it is hard, I think it has been hard for all of us, to get a handle on what these total costs are because there are lots of pieces of it. But the piece I want to focus on, because I think it is the biggest piece—and what Tony Celebrezze primarily focused on—was the cleanup situation. What are we going to do to clean up these facilities?

Over the past 2 years, we have struggled with this with some of the people in this room, some of the States, yourself, and others, on how to do this. The kind of issues we face, briefly, are the following: We have at least two laws, Superfund and the Resource Conservation and Recovery Act, RCRA, that apply. As with most, these two laws do not match perfectly. They were written at different times. So we have a lot of issues with how to integrate those two laws.

Enforceability is a major, major issue. You heard about that this morning. I will touch on it later. How do we be sure these things are really enforceable when people have to do them?

Reimbursement of State costs has been a big issue, which we have largely solved.

Final decision by whom? Governor Romer and I met with Lee Thomas recently to talk about that precise issue for a couple hours at a Rocky Mountain arsenal. Who will make the final decision? Will it be the governor, the EPA administrator, the President, or someone else, when you get to the final decisions on these clean-ups?

Finally, and what Tony also touched on, is the form of the agreement. In other words, should it be a consent decree? Should it be an inter-agency agreement, or what? I will talk about that, also.

Let me tell you now what we are proposing and what we have been doing, because we now have had a fair amount of success and a fair amount of experience in doing this. Our general approach is a three-party, inter-agency agreement, or IAG, under Section 120 of Superfund. In that, we incorporate Superfund cleanup situations, RCRA compliance and cleanup situations, and various State concerns, certain State standards and all that.

We have found that to be a pretty good vehicle to pull everything together in one enforceable document. We think the advantages are that you can comprehensively delineate everything in one document. The State, EPA, and the DOE or DOD can sign off on it. You can cover the full range of contaminants. RCRA does not cover radioactive waste very well. Superfund does. So that is an advan-

tage. We think these are legally binding and enforceable by States and citizens.

Last summer I met with DOE and DOD, and said we need to negotiate some model language that we could use in all the IAG's because they are a hassle to get done. We need to determine provisions that could be used repetitively. We developed 30- or 40-page documents, first with DOE and then a couple of weeks later with DOD, with very minor changes, and said: This is the boilerplate, the legal boilerplate that I want our people to use and I would like the States to use to negotiate these agreements—recognizing that the States have their own issues. This is not meant to put the States in a bind because their own costs, their own standards, their own other—who oversees what or issues they have to deal with. We can do that in the context of these agreements.

Now, these model agreements that we are using have a strong enforceability section; they have a dispute resolution section that involves the State very heavily, with the EPA administrator as the final arbiter. We decided to make the EPA administrator the final decision-maker on Superfund-type cleanups, because we think that is what the law says.

We have stipulated penalties for non-performance. The DOE or the DOD pays a certain amount of money automatically if they do not meet certain deadlines and conditions. And then there is a series of other things that define the roles of all the parties.

What we have been doing, Mr. Chairman, is taking that model language, and instead of going in the field with it, we actually had started a little while earlier with the Twin Cities army ammunition plant in Minnesota, which is sort of a precursor to this, and that was our first Superfund IAG at Twin Cities.

I might want to provide for the record, also, the letter that Attorney General Hubert Humphrey III sent to me commending us for that effort and saying that was fully enforceable and a good way to do business.

We then went for the model language. This fall we reached four more agreements. Very quickly, Lawrence Livermore Lab, a Superfund IAG at Lawrence Livermore Lab for cleanup; the Sacramento Army Ammunition Depot; the Monticello uranium cleanup in Utah; and the Tinker Air Force Base in Oklahoma. Those are all the ones we got in, about a 2- or 3-month period using this model language.

I might say parenthetically, the lawyers in all those States—California, Utah, Oklahoma and others we are doing now—considered these to be fully enforceable agreements, or they would not have signed them.

Very briefly, Mr. Chairman, let me just give you some one or two liners on a few real sites that I know you are interested in, and then I want to close with some recommendations.

Idaho National Engineering Lab, you heard Governor Andrus talk about that. We have a corrective action order in place. We are developing a Superfund IAG to cover the radioactive portion. I am generally pleased with how that is going, and I think the governor is pleased with that.

Fernald, we have the compliance agreement in place which Mr. Celebrezze has put his consent decree in place also. We think we

have a good, enforceable agreement there now. As he is, I am somewhat concerned with some of the slippage in schedules there. I think we have got to work hard at Fernald to be sure. I think we are on the right track, but we have got to monitor it carefully.

Hanford, Ms. Gregoire talked about. About two-thirds of the DOE cleanup budget, at least in their planning, is at Hanford. It is a major, major facility of about 1,500 units. We have done a lot of negotiation, as she indicated. We have an agreement fairly well together. We are now trying to decide what the form of the agreement should be. This is the same issue that Tony Celebrezze raised, which is: Should it be a consent decree? Should it be an IAG?

Rocky Flats, Governor Romer touched on. One of our first agreements, we are upgrading that to a Superfund IAG. Again, I am a little concerned about some of the slippage, and I want to get more definable schedules with penalties in that agreement.

Savannah River is the last one I will touch on a little more specifically. We have a RCRA permit in place there which covers corrective action. We have about 50 single shell tanks of high level radioactive waste, about 400 solid waste management units at Savannah River. We are going to be negotiating a Superfund IAG there to cover radioactive releases.

We have similar efforts under way, Mr. Chairman, at the Mound site, Oak Ridge National Lab, the Pantex facility in Texas, Kansas City Plant, Los Alamos National Lab, and Sandia National Lab.

We have kind of a full court press going now on all the major DOE facilities and hope to get those done soon.

Let me close by giving you five recommendations of what I think ought to be done in this program to move forward. We are at a pretty good base, but we really have got to keep moving quickly.

This advice, Mr. Chairman, if that is what it is, is really based not only this experience with my Superfund experience. In Superfund now, we have work going on at 800 sites; we are doing 300 emergency removals a year; about half the work is being done under orders with responsible parties; and we recovered about a billion dollars for the trust fund. So it is a very active program. I maybe somewhat nonobjective, but I think it is working pretty well now. So I am trying to look at how that \$1.5 billion a year program is working as I make these comments.

No. 1, this year, we should get these enforceable cleanup agreements in place. That to me is almost Priority No. 1 for EPA working with DOE. We have done five; we have got 40 more we are trying to do, including DOD. Most of these are DOD, but there are a number of the DOE ones. This lets people know what the schedule for action is, and we can enforce these schedules. It also allows people to know what the problem is and how we are attacking it.

It also allows people, Mr. Chairman, to get on with what the major options are. I think one of the things that is really going to be interesting here as we go along is when we talked about \$20 and \$30 and \$50 billion, you are also talking, frankly, about very controversial projects in themselves. It is going to take time to condition people as to what is going to be done at Hanford, what is going to be done at Fernald.

In other words, it is not just technical. On Superfund, the technical part is certainly not easy, but it is almost easier than the public

interaction part of what the alternatives are, who prefers what, et cetera. So it is very important to get those going.

No. 2 recommendation, Mr. Chairman, we need to move out faster on doing immediate cleanups that are noncontroversial and straightforward. In the Superfund new rule we just put out for comment, we have something called a "bias for action," where we are saying if you have a problem and it is easily identifiable and it is not terribly expensive and you know what to do, do it. Do not wait for every conceivable study to be finished. And I would like to inculcate some of that kind of thinking in this program.

No. 3, we need to begin laying these 16 real projects, as I call them, or real sites side by side in a prioritization sense. I have looked at the prioritization work that DOE has done, and I think it is a useful first start. But I would prefer to do it slightly differently.

I think you have got to say not looking at all of the problems, hundreds of thousands of problems at all these sites necessarily, but what is the program at Fernald? What is the program at Hanford? And then lay those side by side, because you may find, in the first years, at least, there are not terrible prioritization problems. You may say we can do all of that the first year. You may look 5 and 10 and 15 years out and begin to say: I have got a band here of \$20 to \$40 billion that may occur in the year 2003. That may be a huge problem. But we have got to start talking about real projects with real names laid side by side, and not just a race to the courthouse.

I think Tony and those have done excellent work, and I want to applaud them for it, but I think, also, Congress particularly and the administration particularly have got to be looking at these things as they have all got to be done. And we have got to lay them side by side and identify priorities.

No. 4, Mr. Chairman—and this ties into that to some extent—I would like to see us do, and I have suggested it to DOE, that we need to have a very detailed 5- to 10-year program. I think it is good to look 30 and 40 and 50 and 60 years out with these big bands of what might happen. It is very helpful. But we need to back up now and start looking in great detail at, say, next 5 years. Because what we are into, Mr. Chairman, right now is the study phase, largely the study phase. The study phase is very critical because you are identifying what you are going to do. It is not nearly as expensive, however, as the construction phase.

My background, Mr. Chairman, is in engineering and construction, and I think I can speak from experience that we are going to have to get on with this identification phase. The big bucks are in this ascending curve which we are heading toward. The phase we are in now is actually relatively cheap. To do a conceptual design, which is, in effect, what we are doing here now, is a very small percent of the constructed value. The detailed engineering might be 10 percent of the value, and then the other 90 percent is in the actual construction, which is down the stream a little ways.

A corollary to doing the detail of the 5- to 10-year program is how to organize for the job. You have talked about that. My personal feeling is that we have got some hard thinking to do on how to organize to do this job, both at EPA and DOE and the States.

No. 5, the fifth and last point, we need steady and increasing funding. I can speak from experience what it is like to have an up and down funding situation. When I came here, Superfund was phasing down from \$600 million a year to \$150 million. It then went back from \$150 million to a billion a year. Last year, it was cut by Congress \$200 million in the appropriation. So I have got to hold off some construction projects now.

The point is, Superfund itself is on a pretty level track now, but that up and down thing has been one of the real body blows to the Superfund. We ramped up; we ramped down; we ramped up again. And it has been a real sort of roller coaster for me on Superfund, and I would like to not repeat that, if we could, on this program.

So I think that the mechanism to do it, there are certainly a lot of ways to do it, but it is going to have to be steady and increasing funding, in my judgment, with a lot of debate on where the money comes from.

Mr. Chairman, let me close by saying that we really want to work with you on this important task. We have tried to work very hard on it from our end. I would be happy to answer any questions you may have.

Chairman GLENN. Thank you very much.

I guess my number one question is: From the technical standpoint, do we know how to clean all these things up? We have a number of different kinds of waste and contamination and a bunch of difficult scientific problems here. Do we have the knowledge and the technical know-how to do these things?

Dr. PORTER. Mr. Chairman, I think we largely do. I think there are some specialized areas where our knowledge will have to evolve. I think through the Superfund program and other things, we have learned a lot in the last 6 or 8 years. Some of these things may need to be phased to some extent, but I do not think we can say lack of knowledge is what is holding us up.

I think some ultimate, ultimate remedies may be things that we will have to learn, certainly over the next 5 years or so. But we know a lot about how to contain certain materials, how to incinerate certain materials, how to do other things. A lot of these problems are classical chemical hazardous waste problems.

On the radioactive end, it is a little more esoteric, but I think even there we know quite a bit. And I would say, in general, we have a lot of the knowledge we need. Not all of it, but a lot of it.

Chairman GLENN. I was thinking more of the radioactive end than I was some of the other wastes that are a little easier to handle. Radioactivity, in particular, if it gets into an aquifer level, how do you decontaminate an aquifer level? And what about toxic waste?

Dr. PORTER. Well, I think that one of the things we are having to do in some programs, of course, is just pull out the ground water and strip things out of it.

Now, unfortunately, one of the tensions we have had with radioactive waste and chemical waste is that you maybe would do opposite things. For example, in the RCRA program, we have wanted to treat things and so forth on the radioactive side with some particular material that decays over a hundred years or a thousand years.

That is simply a fact of physics, and we need to contain it as it decays, such as in the WIPP Pilot Plant or some place.

Chairman GLENN. I know no one wants to have these national sacrifice zones accepted, and I have recoiled from that myself as well as Governor Romer. I join him in his comments a little while ago. But when you look at the actual problem, do you think right now that there are going to be some sites where it is going to be less danger if we take certain very contaminated, very radioactive areas, and leave them in place rather than trying to go through all of the tear-up and the dangers of travel with that material across country and so on? Are there going to be certain sites that you see that will be, in effect, isolated zones?

Dr. PORTER. Mr. Chairman, there may be, because I think—this is what I get into. It is kind of relative to what?

In other words, what I want to get into is: At Hanford and these other places, what are the options? Because every option has its pros and cons. At Love Canal, again, just to cite an experience from the other program, we are leaving some chemicals in place in a 40-acre site because we think it would be much more dangerous to dig them up. We have got it isolated. We are cleaning up all the periphery. But we have about 40 acres that for the foreseeable future, at least, is going to sit there with a fence around it, treating the leech aid, et cetera, because we really do believe it will be more dangerous to dig up than to leave it there.

Now, I think that what you are going to have to get into at these places with these alternatives is you can dig it up and take it to another State. They probably do not want it either. You can dig it up and incinerate, in some cases, or treat it, or you can leave certain things there. I think it is very much a case-by-case decision.

Chairman GLENN. Have you run such an assessment across the country at all the nuclear sites?

Dr. PORTER. I am sorry?

Chairman GLENN. Have you run an assessment of what might have to stay in place at the different sites?

Dr. PORTER. We have not done that explicitly. No, Mr. Chairman.

Chairman GLENN. Will that be up to you, or will you leave that up to DOE to determine?

Dr. PORTER. We would have to work with them on it, because the final remedy, the final action at these sites, to the extent we disagree with the DOE, will be the EPA administrator's judgment. So I would think we would have to be very involved in that.

Chairman GLENN. Are there any of the DOE weapons plant sites now in compliance?

Dr. PORTER. It depends on what you mean by compliance. I think that some are certainly doing better than others. We have certain RCRA violations at virtually all of them. Some of these are more serious than others. I would say that in terms of compliance with the program for cleanup and things like that, that INEL is doing a good job. Some of the others kind of fall back from that.

It is kind of a gradation in terms of where they are. We are getting them in compliance, but it has been a struggle.

Chairman GLENN. Well, given the money requested in the budget for compliance and cleanup, which seems to be about \$315 million, could you give us an estimate of how many more facilities will

come into compliance with applicable Federal and State laws with an expenditure like that?

Dr. PORTER. Mr. Chairman, that 315 is for the cleanup program per se. They have other moneys for compliance with the sort of base programs. It is hard for me to react explicitly to that. That 315 is mainly the number they have set aside for cleanup at these sites. It is a down payment. It is simply a start of the studies. It is a start to that \$30 to \$60 billion or whatever, that 315.

Chairman GLENN. In your testimony, you state that the A-106 pollution abatement plans, a system that EPA is supposed to use to track Federal compliance and proposed project costs for the budget, does not seem to work. You indicate the system does not reflect total budget amounts. How can you ensure compliance if you cannot adequately track Federal Agency A-106 funding requests in the present budget?

Dr. PORTER. Mr. Chairman, that is something we have to look at. Because the way the A-106 review process is set up for pollution control projects, it does not capture—and this is just the way the system is set up at OMB—it does not capture certain things in the defense budget such as certain classified projects routine operating costs, monitoring or certain other kinds of things. I think we have to talk to the Secretary about that, and Mr. Darman about it particularly. I would not say it is not working totally, but it was not set up for this kind of effort. It was set up more for compliance with environmental laws and things like that.

Chairman GLENN. One of the examples that I had was that the A-106 reports say that DOE needs a million dollars to mitigate the thermal effects of reactor effluent at Savannah River, while the SRP operations environmental activities report appears, at least, to request \$40 million for fiscal year 1990. And more confusing still, the A-106 report suggests that over \$13 million is needed for Fernald in fiscal year 1990 so it can be brought into compliance with Superfund. The Fernald operations office appears to have requested only about \$5 million, and the President's budget request makes no site-specific mention of Superfund in the ES&H section and seems to suggest only \$1.6 million at Fernald in defense waste and restoration.

If you can make any sense out of that, do you have any comment? If so, what?

Dr. PORTER. I cannot make any sense out of it, either.

I think we have got to take a look at that. I think we have to take a look at the process in this new ball game we are in now.

I think that process has been useful for day-to-day pollution control but in this whole cleanup area, with this kind of money, we have to sit down and talk about that process.

[Information subsequently submitted follows:]

At Savannah River, the Thermal Mitigation Project changed subsequent to the issuance of the A-106 report in September, 1988. DOE increased the funding of the project by requesting funds in FY 1990 that had previously been planned for FY 1991.

At Fernald, there are a number of environmental projects in DOE's Defense Budget Request that relate to Superfund. These include \$16.245 million for environmental restoration (See page 220 of the request). Other projects at Fernald that address related activities are a line item construction project for environment, safety

and health improvements of \$55.111 million (See page 203) and \$14.093 million in waste operations and projects (see pages 242-3).

Chairman GLENN. You heard Tony Celebrezze's comment a few moments ago about the difference between consent decrees and compliance agreements. He disagreed with your feeling that compliance agreements were enforceable.

Do you wish to respond to his comment?

Dr. PORTER. Mr. Chairman, I do not want to get into a big debate on the relative values of that. I think on a case-by-case basis, you may do one or the other. As a general matter, we prefer the IAG. And let me just talk about timing a minute. Again, I applaud Tony for this. Tony has worked for years on that consent decree, and at Rocky Mountain Arsenal, Governor Romer and his attorney general worked for 5 years in a litigation sense. We are not there.

This fall, we did six IAG's. Through an administrative route, it is faster, No. 1. No. 2, the Department of Justice and the State AG's, at least many of them that I have talked to and the ones that have signed these so far, seem to believe these agreements are fully enforceable.

I think what Tony has done has saved some steps. I am not a lawyer, but it is my understanding some steps are saved if you have a consent decree. You are sort of already in court and so forth. But under the IAG's, which are tied to the Superfund law which allows this, you can go into court to enforce these. So some time may be saved in enforcing them, but that is at the expense of a lot of litigation.

Chairman GLENN. Let us say there is an inter-agency agreement, and you say those are fully enforceable. If DOE violates the law or an agreement, can they immediately be penalized monetarily for failure to comply?

Dr. PORTER. Yes. We are building into these agreements stipulated penalties. If they do not meet certain requirements, so many thousands of dollars a day penalty accrues automatically. It is self-enforcing.

Chairman GLENN. Does the same thing apply to a response to a request of a citizen's suit?

Dr. PORTER. A citizen can sue them under this, yes.

Chairman GLENN. What is EPA's specific policy to enable the production and utilization of facilities in the bomb program to reach compliance agreements with States and EPA with respect to RCRA, Superfund, and other environmental statutes?

Dr. PORTER. Mr. Chairman, what we have this year is a schedule for reaching inter-agency agreements at all those facilities. We have done a couple already. We have 12 or 14 to go. And in this calendar year, we pretty much expect to do all of them. I am spending a lot of personal time on this trying to finish negotiating these agreements which will wrap in RCRA and Superfund and other concerns. We have a schedule we can provide you on the timing for that.

Chairman GLENN. In your testimony, you indicate EPA has given a final RCRA permit at Savannah River, yet your A-106 pollution abatement plans list 10 projects that are out of compliance under RCRA at Savannah River. How do the project plans and budget request reconcile with the final RCRA permit you have issued?

Dr. PORTER. The final permit is to operate certain land disposal facilities, but tied to that is a so-called corrective action piece which says there is a lot of other work you have got to do on this site. I mean, RCRA allows you, in sort of a return for getting a permit for one operating unit that is in compliance, you then have to do corrective action to all the other things on site which are not in compliance. So there will be a lot of work there.

Chairman GLENN. Yesterday, Mr. Wade's testimony made it clear that compliance schedules were not factored into the prioritization report that DOE issued, ranking its sites by danger to public health. This is in contrast to your testimony today and Administrator Thomas's view. Does this mean that DOE's priorities for clean-up and compliance are not the same as EPA's?

Dr. PORTER. Well, I think we have a problem there. That is one of the problems I have with their prioritization. I think we develop these agreements, and there is real schedules in those agreements, they are enforceable and they are tied to stipulated penalties, what I suggest they do and I think they are going to have to do is follow those schedules. You know, we only have a couple of those so far, but as we complete these agreements, they will have schedules of compliance.

Chairman GLENN. During one of the Committee's hearings on S. 1085 back in March of 1987, Senator Mitchell asked you, asked EPA, to conduct an analysis of Section 6001 of RCRA, Resource Conservation and Recovery Act, its provision and the legislative intent, and to advise the Committee of the opinion of EPA's counsel. As yet, according to Senator Mitchell and the Committee staff, there has been no response to that.

The point in question is: Does the department believe the waiver of sovereign immunity extends to State laws, or is it limited, as the Justice Department has argued, just to other Federal agencies? Do you know what the status of that is? Has that ever been replied to? Or what is your opinion on that?

Dr. PORTER. I have got to check on that, Mr. Chairman. I am not sure. I remember the question vividly in the hearing, but I do not remember—I assume we have responded, but I will double check.

Chairman GLENN. All right. Fine. We would appreciate an answer on that one.

Dr. PORTER. If not, we will.

Chairman GLENN. We will have some follow-up questions for you that I have here. We will not take time for them right now because we do have another panel here this morning. And there may be questions from other Senators who were not able to be here this morning. We would appreciate an early reply to those.

I do not know whether any of the rest of your colleagues have comments to make this morning. I would welcome any. Mr. Grundler, do you have any comments?

Mr. GRUNDLER. No.

Chairman GLENN. Mr. Sanderson.

Mr. SANDERSON. No, sir.

Chairman GLENN. You have been interested observers, anyway.

Our next panel is one that was not able to be with us yesterday because of other scheduling conflicts that they had. So we put them

on today even though their testimony might more properly have been included with yesterday's hearing.

Dr. John F. Ahearne, Chairman of the Advisory Committee on Nuclear Facility Safety, and Dr. Richard A. Meserve of the National Academy of Sciences. We welcome you both this morning.

Dr. Ahearne, we look forward to your testimony, either in its entirety or an abridged version. In either case, it will be included in the record in its entirety.

Dr. Meserve, welcome to you also. We look forward to your testimony. Good to see you again.

TESTIMONY OF JOHN F. AHEARNE, PH.D., CHAIRMAN, ADVISORY COMMITTEE ON NUCLEAR FACILITY SAFETY, DEPARTMENT OF ENERGY

Dr. AHEARNE. Thank you, Senator. I have a relatively short testimony, so I would like to give it, if I could.

Chairman GLENN. Fine.

Dr. AHEARNE. I am pleased to respond to your invitation to testify on the issues concerning the Department of Energy's nuclear weapons production complex. Your letter requested a discussion of seven issues. As noted in the invitation and in your introduction, I am here in my capacity as Chairman of an Advisory Committee. I believe, therefore, it is appropriate to address those issues which the Advisory Committee charter identifies as within our scope, and, in particular—since I am here on behalf of the Committee—to address those issues which the Committee itself has addressed.

Our Committee's charter extends to safety, safety concerns with respect to the Energy Department's nuclear facilities. The Committee has not addressed and the previous Secretary had not requested we address to what extent environmental matters overlap with safety issues. Since we have not had any discussions with members of the transition team nor with representatives of the Secretary-Designate, I do not know whether Admiral Watkins will make such a request.

So let me go down the seven items that you asked about. First was the budget request. The budget request was published after our last meeting in December. And although we did have a meeting in the last 2 days, we did not address it. However, I doubt we will be asked to address its overall adequacy. Were we to be asked by the new Secretary, I am not certain there is enough information available to make a judgment was to whether it is adequate. Also, as we know, there is a new President. Shortly, there will be a new Secretary of Energy, and there will probably be a new budget. We both have been through many transitions between administrations, and we have seen new budgets come up.

The second, the committee—that is, my committee—has addressed the DOE's plans to restart the Savannah River reactors. The most complete description of our position on the restart status is in the letter of December 14 to the Secretary, which I provided to you. That is the complete position on the restart strategy. Also, I submitted the Advisory Committee's letter of December 14 to the Chairman of the Senate Armed Services Committee, which provided additional background information.

With respect to Rocky Flats, which was another plant you asked about, my Committee has not yet examined the situation of that facility. We got a preliminary briefing on it 2 days ago, and our meeting in March will spend 2 days out at Rocky Flats.

With respect to the 2010 study, we did receive a briefing on the study at our meeting 2 days ago, but we have not yet prepared a set of comments on it. We will do so. The process that we go through is, after having received information, we then generate a set of comments and then provide those in a letter to the Secretary. And you will also be provided that letter.

However, I do note that the unclassified report identified what they said the major assumption of the plan was:

that nuclear weapons will remain a principal element of the security of the United States for the foreseeable future. In addition, the plan listed 4 items as the principal requirements central to the need for modernizing the complex. . . .

The major assumption in three of the four items are outside the scope of my Advisory Committee. Only the safety aspect of the item, "Complying with environmental, safety, and health requirements," falls within the purview of my Advisory Committee. Consequently, it is unlikely we will review the 2010 study in detail, other than examining the programs related to safety.

The report is referred to as the "December Report," and I conclude—and you mentioned earlier this morning—that it is the "Environment, Safety, and Health Needs of the U.S. Department of Energy." There are two volumes. Volume 2 is the important volume with respect to safety issues because it provides some details on safety issues. But there is not much detail provided. It is not unexpected in a report covering such a wide range of issues. This report was only issued January 12. One of the Subcommittees of my Committee, which is a Committee on Radiological Protection, Radiological Safety, is looking at it. But since the report has just come out, we have no comment.

You mentioned a Prioritization Report, and I conclude that is the September 1988 Preliminary Summary Report. The document focuses on environmental issues, not on nuclear safety issues. So many of the items discussion in the document may not come under the charter of my Committee. As you know, the document stresses that it is preliminary and that the final report is not due until the fall of 1989. I note that its priorities are based upon a model called MEPAS. I am not familiar with that model. I asked 2 days ago at my Committee meeting whether those who are in the environmental area were familiar with that model, and they were not. One of the questions with any rankings based upon a model is: Has the model been validated?

Finally, the Fernald dose reconstruction study or the department's health studies. When I wrote the testimony and submitted it, I had no information. Since then, I have been provided with stacks of documents, but as I read through them yesterday, they did not really have much more, it seemed, than a lot of old material, plus on the Hanford dose reconstruction study, the work plan. And on that, although it was a fairly elaborate work plan, it did note that the reconstruction will not be completed until 1993,

which is another way, I think, of saying that they are just slowly beginning to work through that.

Chairman GLENN. Well, were you familiar with the testimony here yesterday?

Dr. AHEARNE. No. I just heard what you said this morning.

Chairman GLENN. Mr. Bibb from the Oak Ridge Operations Office said that that information was just not going to be available.

Dr. AHEARNE. At Hanford or Fernald?

Chairman GLENN. At Fernald.

Dr. AHEARNE. I was speaking about the Hanford site.

Chairman GLENN. We were talking particularly about Fernald. Okay. You did not have the dose information for Fernald.

Dr. AHEARNE. No, I did not. I have asked for the information, and so far I have not gotten anything on Fernald.

Chairman GLENN. But it would appear that if Fernald is going to be—we know what the situation is at Fernald. If that is the same as at other plants, we may never have adequate dose information. And it would appear to me, at least, that the only option then is to do empirical studies of what the results are. We have a generation or generation-and-a-half, now, that has grown up around these areas, and it would seem to me we would have to do statistical, empirical studies and see what the results are. We have live guinea pigs out there in the form of many hundreds of thousands of human beings running around that we can just run statistical studies on to see what the situation is.

Dr. AHEARNE. Without endorsing your term, which I think is probably unfortunately true, "guinea pig," I would agree with you. My Committee has not addressed that, but it seems to me that in any one of these issues, there are two elements. One, there is the epidemiological study of all of the people in the area. Then there is the other which is the engineering, physics, et cetera, study of what were the doses that were produced. And it would seem to me that those are two elements. And just because—I do not think one should wait for the other. They should both be going on.

Finally, a set of personal comments. I would note that the issues addressed by your Committee, and others of the Congress, and by the department, as you know, are quite large. The problems took many years to develop, decades, and they will take many years to resolve. There have been, certainly when calculated in inflated dollars, billions unspent, and so it should not be surprising that problems will take billions to resolve. As we also know from other technology-based systems, such as space and commercial nuclear power, deferring attention to problems increases the costs of their solution.

For problems of the magnitude of those being discussed, care must be taken in developing solutions to avoid wasting large amounts of money and time. You have to establish a baseline so that solid knowledge is developed of what is the current status. I suspect that is a lot easier for above-ground hardware than for below-ground contamination. The department has to establish standards, including what criteria will be used. In other words, to what levels must cleanups be taken? It has to establish what are to be safety standards. Now, I hope we have moved beyond the zero risk and zero contamination as criteria. They have a certain attrac-

tiveness, but operating any system introduces some risk, and running any system requires a balancing between hazards and benefits.

In addition, in developing a plan, one must address how soon must what be done. Several options should be developed, several plans developed to get from where the baseline says we are to where the criteria say we must be. After going through that process, resources demands can be identified. Uncertainty is going to be present; it is imprudent to mask uncertainty.

My own preliminary review of the many documents that the department has developed is that they represent an effort to produce necessary information. They are a mixture of good and bad studies, surveys, and estimates. It is going to take iteration to bring it to a uniform level. Substantial effort is going to be required to review, scrub, and integration the information.

That is all I have as prepared testimony, and I will be glad to answer any questions you may have.

Chairman GLENN. Thank you, Dr. Ahearne.

Dr. Meserve, we will have your testimony, and then we will discuss some of these things.

TESTIMONY OF RICHARD A. MESERVE, PH.D., CHAIRMAN, COMMITTEE TO PROVIDE INTERIM OVERSIGHT OF THE DOE NUCLEAR WEAPONS COMPLEX, NATIONAL ACADEMY OF SCIENCES

Dr. MESERVE. Thank you, Mr. Chairman.

I am very pleased to join you this morning to testify on behalf of the National Academy of Sciences. I will give an abbreviated version of the testimony that I have submitted for the record.¹

I shall first describe some of the past work that has been undertaken by the Academy relating to the weapons complex, and then I shall turn to some of the Academy's work that is currently under way.

Shortly after the accident at the Chernobyl Nuclear Power Station in April 1986, Secretary Herrington requested the National Academy of Sciences and the National Academy of Engineering to establish a committee to examine safety and technical issues at the department's major reactors. At the suggestion of the department, the Committee focused its efforts initially on the department's production reactors. The Committee issued a report entitled "Safety Issues at the Defense Production Reactors" in October of 1987. The report emphasized the need to establish a clear and unambiguous safety framework; discussed a variety of technical issues that the committee uncovered in the course of its work, and made several recommendations for improved management. I had the opportunity to testify before you, Mr. Chairman, in your role with the Senate Armed Services Committee with regard to that report in October of 1987.

In addition to the operation of the production reactors, the department operates five other large reactors to produce radioisotopes for medical and other purposes, to provide neutron sources,

¹ See p. 275.

to conduct radiation and other experiments. The Committee's conclusions and recommendations with regard to these additional reactors are found in this report entitled "Safety Issues at the DOE Test and Research Reactors," issued in August of 1988. Like the earlier report on the production reactors, the second report identified a series of issues relating to the Department's operation of the test and research reactors that we urged the Department to address and respond to.

Your invitation to testify this morning asked, among other matters, if I would discuss the Department's efforts to deal with the Academy's studies of the production reactors. Upon the issuance of its two reports, the Academies had completed their work, and the Committee was disbanded. There has thus been no organized examination by the Academies of the adequacy of the Department's response to the various recommendations that were made by the Committee.

I know, however, that the Department has submitted a detailed report to Congress setting out its response to the Committee's recommendations. The report indicates that the Department has endorsed the Committee's recommendations and has taken actions to respond to all of them. Although neither the Academies nor I have had occasion to examine the substance of their work, it appears that the department has taken the recommendations very seriously and has attempted to respond to them in a thorough fashion.

I might add that one of our recommendations was for the creation of the Advisory Committee on Nuclear Facility Safety, which is being so ably chaired by John Ahearne and which was created as a result of the Academy's recommendation.

As I mentioned at the outset, the Academies also have activities that are now under way relating to the nuclear weapons complex more generally. Section 3134 of the Defense Authorization Act of 1988 provided that the Academies were to review the operation of the defense nuclear facilities. In response, the Academies formed a committee of 23 individuals. The members provide expertise in a wide range of areas. A list of the members, including concise biographical sketches, is set out as an appendix to my testimony.

The committee's efforts—and I am talking now about the current committee—focus on the various facilities engaged in the chemical processing of the materials that are used in weapons and on the production of components for and assembly of those weapons. Because of the previous work by the Academy relating to the production reactors, the committee's work will not encompass those reactors.

Our final report will include a consideration of safety and technical issues at the facilities and a discussion of steps that we hope would enhance the safety of operations. It will also include a consideration of the environmental impacts of those operations.

Our work is now well under way. The committee has visited the chemical processing facilities at Hanford and the Y-12 plant in Oak Ridge. Future visits are planned over the next several months to a wide variety of other facilities. Although the committee is not able to visit all of the facilities in the complex, we will seek to examine a representative cross section. We believe our examination

will provide an adequate foundation to provide knowledgeable and helpful recommendations.

We anticipate the issuance of a final report in December of 1989. Because our work is only now under way, I am not able at this point to predict the substance of our report. However, I would welcome the opportunity to appear before you and your colleagues, once our work is completed, to discuss our conclusions.

Chairman GLENN. I would be happy to accommodate you when that report is available. We would be more than happy to have you come back and provide a hearing for that.

Dr. Ahearne, as Chairman of the Advisory Committee on Nuclear Facility Safety, which was set up as a result of dual work, really, with the National Academy, you are aware of some of their recommendations of what should be done with outside observation of safety matters within DOE, and the work of this Committee that we were pushing in that area. I had legislation in, S. 1085, which was to provide a defense nuclear facility safety oversight board. They, too, I think at that time at least, to partially forestall that legislation, I think I can safely say that that was one of the motivating factors that pushed them into—

Dr. AHEARNE. You are not asking me to respond to that?

Chairman GLENN. No, I am not asking you to. I would not be that mean to you this morning. They went ahead and tried to forestall that because they were opposing the statutory requirements of the safety board.

Well, we have that passed now, and we are now into the new administration when this board has to be appointed. Have you had any indication of when they are going to move on appointing members to the board which will replace your group as a new permanent group?

Dr. AHEARNE. Let me answer that short and long. The short is that all I know is that various discussions have been under way with some people, starting back in December, would they be interested in being on the board from some office in OMB. But I guess the term "replace my group," I am surprised you would say that in the sense that although—

Chairman GLENN. That was a mis-statement. I did not mean it that way.

Dr. AHEARNE. And because I do not think there should be a mistake, my group is much more similar to the Advisory Committee on Reactor Safeguards of the NRC. It is an advisory group. We are a part-time group. Most of the people—and I will put myself aside—most of the people are really expert in the areas. Consequently, they provide detailed, specific advice on selected issues.

The new group, the Nuclear Safety Board, at least as I have read the legislation—and you know we participated in some hearings—that is much closer to the NRC. And so I would see that any type of function transfer, where that strain may come is in the health, safety and environmental office of the DOE and that board. I see ourselves still as just advisers to the Secretary.

Chairman GLENN. With your background and experience as former Chairman of the Nuclear Regulatory Commission and all the work you did there, and your familiarity with this whole field, do you see any reason why DOE in the future cannot come up to

civilian standards of operations of safety and health and environmental compliance?

Dr. AHEARNE. I do not see why they should not certainly put a major effort into trying to get there. That is the goal that I know my Committee has already identified, comparable to civilian standards as being the goal that they should be working towards.

When you say any reason for not getting there, the reasons that they might not get there are the reasons they are in the problems they are right now; that is, a lack of understanding of what that is, lack of adequate funding for facilities and for work, lack of competence in personnel involved. Those are the problems that got the situation to develop. That is where we are today, and those have to be overcome in order to get to where you suggested and my Committee has suggested they ought to get to.

Chairman GLENN. Dr. Meserve, do you have a comment on that?

Dr. MESERVE. The Department has established as a goal that it will seek to achieve comparability with civilian facilities, and I think that that is an admirable goal. I think one of the major constraints is going to be funding. They are operating facilities that are very old, and bringing them up to speed is going to be a very expensive and difficult task.

Chairman GLENN. There is no technical reason. There is no reason why the technical operation of these plants is so different that they could not be brought into compliance. And my impression from what I know about it—and certainly not at your level of expertise by any means—is that the basic principles of radioactivity and then the radiation, the production of plutonium and tritium and so on is comparable enough to a regular civilian reactor, electrical generating reactor, that we could have the same standards apply.

Dr. AHEARNE. Certainly, that is true, Senator. One of the points that one has to recognize is that we are not working off of a clean slate; that is, there is a different approach that could be taken for the new production reactor than from the existing reactors.

The Nuclear Regulatory Commission, for example, in the late 1970's looked at all the plants that they had under their regulatory oversight to see on their upgrades. And they had a program—as I recall, SEP was the acronym—to selectively evaluate the oldest plants to examine what standards should they be brought up to, recognizing that they had been constructed in the days before the newer standards came out. Consequently, those oldest plants were allowed to have less significant changes made to them as long as compensating measures were included. I expect that something similar was going to have to be done with respect to these very old facilities.

Chairman GLENN. According to public remarks by your fellow Committee member, Harold Lewis, the DOE may be sacrificing safety in its hurry to build two new production reactors. Dr. Lewis was quoted as saying that DOE's plans are clearly hurry-up plans in the sense that one wants to get cracking on the new reactors, while safety standards to be applied are not yet entirely clear.

Do you agree with Dr. Lewis on that?

Dr. AHEARNE. As we both know, Dr. Lewis is a very unusual, very bright individual who does say many things that at times it

may be a little difficult for the reporter to accurately catch what he is saying. I was sitting next to him when he said a lot of that, so let me see if I can—Hal, I am sorry if I am trying to explain what you said.

What I believe he meant—and this is part that I share with him—he is the Subcommittee Chairman of our new Production Reactor Subcommittee. His concern is that what DOE seems to be doing is in their commitment to a schedule to get a new production reactor built, they are saying that we will work on each phase of the design, develop the safety standards for it, and then move into final design and, if necessary, beginning construction, while at the same time we are then going to be working on the next element of the design and develop the safety standards for it, and then move that into construction.

His concern is that that very easily is the kind of problem that you and I have both seen in the Defense Department, where you have concurrent research, development, and production. And we both know—and the B-1 is a good example of what happens when you do that. You end up getting far ahead of yourself; you find problems then coming up; and it is a heck of a lot more expensive to fix them.

His argument was that the department ought to try to develop its overall safety standards and make sure that they then analyze that whole design so that you see how the pieces interact before you move forward. That was the issue he was trying to raise.

Chairman GLENN. Dr. Meserve, do you have any comment on that?

Dr. MESERVE. I have not had occasion to look at the department's plans in connection with the new production reactor.

Chairman GLENN. Okay. As we go to a new reactor, since we are on that subject right now, what do you think is required in that area? You have looked at this as closely as anybody in the country. Do you feel we need two reactors, one reactor? Can we operate P,K&L at reduced levels and get by with one reactor? Should it be a linear accelerator? Should that be considered, which has been in the papers recently? And now there is a new article just this morning, that indicates that we now have scientists saying, no, we are not along that far yet with linear accelerators.

What is your comment on the whole requirement here for tritium and/or possible backup plutonium production?

Dr. AHEARNE. Well, Senator, my committee focused on safety of the reactors. It has not gotten involved with the need for the tritium. So that part of your question, which is obviously a fundamental concern, I would guess that that is the heart of the discussions that Secretary Watkins has to have with Secretary Tower, and involve probably Mr. Scowcroft, and then that is the issue that I would guess the Armed Services Committee, et cetera, have to really look at. That is not an element that we look at.

Now, as far as the others go, our concern with respect to the new production reactors, as one of the members of my Committee pointed out, is that if you are trying to embark on two separate, quite different designs, in a situation where you do not really have the detailed safety conditions nor the analyses developed, it compounds the problem. It makes it twice as difficult. So there is a real diffi-

culty in trying to go forward with two basic designs. For those elements my Committee has spoken on, that is their attitude.

On the accelerators, that is something that we have just recently heard about. Hal and his people will be looking into it. Obviously, as someone who used to be a physicist, once you start talking about accelerators, it is very interesting, but economic and logical and sensible it may not be.

Chairman GLENN. Dr. Meserve, what is the Academy's view of this?

Dr. MESERVE. We also did not have occasion to examine the need for the material, which is the critical variable, I think, in deciding which way you go. The need is something that would be a factor in whether an accelerator is a feasible route to its production. It would take a lot of electrical energy to run such a system.

We have not had occasion to look at the Department's plans. I do know, however, that the Energy Research Advisory Board of the Department of Energy had advised the Secretary on that matter, and I am sure that their recommendations and report is publicly available.

Chairman GLENN. Let me break this down a little bit. The operation of PK&L, we would like to get those back on stream again. You have had a good look at those. Your group has looked at those.

Dr. AHEARNE. Right.

Chairman GLENN. Could you give us any tentative date by which you think they could be back on stream again? That has been speculated on very widely, and you have had a look at the problems there.

Dr. AHEARNE. Certainly.

Chairman GLENN. I would break it down even further and say this: Is it mainly a hardware problem, or is it procedures and management getting the team going better? We had a lot of comment on this yesterday, the new problems over last weekend where just faulty procedures were involved. Is it mainly working that out, or is it really hardware that we are talking about?

Dr. AHEARNE. Well, with the possible exception of a couple of things I will mention in a minute, the largest problems we saw were the whole operating philosophy that imbued Savannah River and the organizations that run Savannah River. My Committee's principal concerns were that we did not detect an understanding, as we went down through many levels at Savannah River, of what does it take to keep safety as the first focus of the operation. We did not detect that skeptical approach to, when something anomalous happens, to make sure that—you, as a former pilot, well understand that if there is something that is going wrong with your aircraft that is not what you are used to understanding happening, you do not forget about it. The latter was the approach that they took for years at Savannah River.

The whole idea that the reactors were items that had to be analyzed, constantly addressed, constantly kept attention to, was just not present. As I think Richard Starostecki from the Energy Department has pointed out, it is going to take a culture change. You can fix a piece of hardware in a time that can be calculated. An engineer can look at a broken pipe and say: It is going to take me

so long to fix it. We are not yet at the stage we can really tell how long does it take to change the attitudes of thousands of people.

That was the fundamental problem we saw. We also saw this confused layering structure of who is in charge at Savannah River. It is difficult to tell. The way the Energy Department has operated with the Savannah River operations office, with the defense programs, with the environmental safety and health office, with the Dupont contractor and now with two contractors actually on site, Dupont is still formally there, Westinghouse coming in—it is very hard for I think the people trying to do the work to tell which message do they listen to.

So those are not hardware issues, but they are very serious people problems. When you have, for example, years of training that have led operators to believe that you follow procedures unthinkingly, you get the kinds of problems that showed up in August and, apparently, have just re-shown up.

I was looking back at the summary. We had sent a summary in the December 14th letter to Senator Nunn, and we were talking about the P reactor's problems in August. And we said a degree of complacency had apparently developed in the operation of the reactor, the willingness to proceed to power in the face of a large discrepancy. Second was operational readiness reviews are not sufficiently thorough. And, third, communications between the operating contractor at Savannah River operations office are still not adequate.

We could write the same things about what just happened. There does not seem to have been much of a change after many months. So my committee, when we wrote our letter to Herrington in December, said we endorsed his statement that the reactors could not be started until the spring or summer. That certainly is—we have not been asked by the Secretary directly. We are an advisory committee so we are not in the line management, and we should not be. But I think, by and large, most of my Committee are very skeptical about the ability to get these reactors up on our safety analysis approach during this summer.

I say on our safety analysis approach because there is always an asterisk. And the asterisk is the one that we spoke about earlier. How badly do you need the tritium? What kind of a risk are you willing to take? That is not the area we are addressing.

Chairman GLENN. That puts a little different light on the whole problem. There is no doubt about that. And I am not all that optimistic when you realize that almost all the people that will be doing the hands-on running of the plants are the same people that are there right now. It will be different management, but that is going to be a comparatively few people.

Dr. AHEARNE. You are absolutely right. My understanding is there will be about 40 new people, and there are about 16,000 people on site.

It is certainly possible for 40 people to make a change, but I will note a similar situation. The NRC had a lot of problems with a plant, Pilgrim up in Massachusetts, and it had to be shut down for 2 years. They are just now allowing it to get restarted, and there were a lot of changes in the organization required. A lot of people

had to be removed, new people brought in at many layers before there was enough of a change that had taken place.

Chairman GLENN. Do you see what the delays in this would be? Is there going to be a necessity for people to go back through any additional training? We could quantify that as to the time required to do certain schooling and things like that. But I do not know how you quantify or how you put a time leash on something where you are talking about an attitude change. And I know some of the people that were down there inspecting the plant last summer came back saying they were appalled at the attitude. There was a "cavalier attitude" there. Those were two words I remember they used in testimony last summer.

How do you change that, or what is the time period we put on this?

Dr. AHEARNE. Well, I have seen changes in military units when a new brigade commander comes in or a new ship captain comes in. And I have seen changes turn around in about 6 months. You have even more experience than I do in that.

So that is certainly possible by a very strong management to get many of those changes. The training, yes, I am sure there is going to have to be retraining. One of the questions my committee raised is whether the people that they had brought in on the operations side really had the capabilities, the background, to be able to handle the reactor operations. That is another element that I believe the department and Westinghouse are rethinking and are looking at: What should be the qualifications?

In the commercial world, it takes anywhere from 18 months to 2 years to take a new person and train them thoroughly enough so that they are now able to run the reactor by themselves. I am not sure whether that is the kind of length of time one is talking about, but it is certainly more than a few weeks.

Chairman GLENN. Let us say we have that attitude change, there is a real new gung-ho attitude there, and everybody is going to live up to the rules and the rules are good. Is there any hardware that has to be changed there before they can be safely restarted?

Dr. AHEARNE. Now, on the hardware side, I will have to say I do not know what kind of damage occurred as a result of the water hammer and such. They obviously have to go through and check that.

The ultrasonic testing and the various testing for pipe cracking has identified enough cracks that it is leading the department to re-evaluate whether the criteria for pipe replacement that Dupont had used is an acceptable criteria. Both in the commercial world and in the defense world, cracks in pipes are not unusual. These are microscopic cracks. The question is: How bad can you allow a crack to be before you have to cut the pipe out and replace it?

What the Department of Energy told us 2 days ago was that they were re-evaluating Dupont's criteria, and they suspected they were going to make it tighter, which would mean that some of the pipes that now had passed after they had inspected them were not going to pass, and those were going to have to be replaced.

They are going through what is called a "walk-down," which means that you take a team of people who are experts in various areas, and you walk through the plant. This is, for example, to try

to make an assessment of the seismic ability, the ability of the plant to withstand a seismic shock. The walk-downs are not completed. They may also identify hardware fixes that have to be changed.

Really, at this point, it is too early to even tell how much hardware changes might have to be made.

Chairman GLENN. Are the hardware difficulties that we have there such that the plant can be operated safely with those difficulties, as you see them now, either one of you? Can it safely be operated, say, at 25, 50 percent capacity or whatever? Or are the hardware difficulties problems that would be unsafe to operate the plant at any operating level?

Dr. AHEARNE. I am afraid most of my answers are long. Maybe you can give a short one.

Chairman GLENN. Dr. Meserve, jump in here any time.

Dr. MESERVE. He is doing a good job.

Dr. AHEARNE. There are two types of hardware difficulties that the NRC will allow while a plant continues to run. I am looking at it from that kind of a perspective.

There is one set where you know what you have to fix and you know the risks you are running by leaving it running. For example, the NRC usually has requirements that there be redundant large pumps to be able to pump water in there in case of an accident. They will allow one of the pumps to be down for a fixed amount of time. You can run the plant, and depending on the type of pump and a lot of other details, it could be a day or it may be even a week before you would have to take the plant down to fix it.

There are some of the seismic problems the NRC had discovered that, because they concluded that an earthquake shock is such a low risk, they allowed plants to go 1, 2 or 3 years before those fixes were made. That is one set of fixes. And to the extent that those kinds of fixes are identified for Savannah River, it is entirely possible that they can make a decision with which people like my Committee would be comfortable to then say: All right, we know what the problem is and we are going to fix it, but it is going to take us 2 years to fix it. We want to run the plant in the interim. That is one kind.

There is another kind which is you do not know how serious the problem is. That is what the National Academy identified when they went down there. They found that the Savannah River people could not demonstrate the analysis to show that the plant could actually handle a loss of coolant accident. The design basis accident for the plant, they did not have the analysis to justify running it. That is what led the Academy—I think in a fairly unusual step—to actually send a letter before your report was done. It led the department to lower the operating power down to about 45 percent.

Chairman GLENN. That is when it had been taken down to 75, and then you determined it was not adequate, the secondary cooling loop, as I recall. Was it not? It would not handle the levels that it operated at for 7 years? Was that it? And then you went on down to 50 or 45 percent; is that it?

Dr. MESERVE. That is basically correct.

Dr. AHEARNE. And we have looked at that more, as has the department, and my Committee's conclusion—and that is what we

wrote in our letter to the Secretary—is that on the basis of what we see now, they cannot justify any power level.

It is that level of uncertainty, that area, that is tied to the fact that for so many years, the kinds of detailed analysis that the NRC has required of the commercial world was not done. That is a level of uncertainty that is very much a judgment, when you reach the position, of are you going to run the reactor or not. It is going to have to be based, I believe, on sort of expert judgment. Because at least my Committee has concluded that analysis and the experiments to back it up will not be done for years.

Chairman GLENN. For years. So as you see it right now, unless there are some major changes in that area, you would say that it could be down for years. Is that right?

Dr. AHEARNE. No. What I have tried to say is that if you are going to require that it meet the same standards the NRC would require—that is, the detailed analysis—then the NRC would not allow the plant to run. But this is an anomalous situation. The NRC would not have allowed all the plant to go for that. As they kept on requiring tighter analysis, they would have required that analysis of this plant.

Now, the department and the operators understand this difficulty, and they have been trying to construct an alternative design basis accident based upon leak before break, which is a term which says that, instead of the pipe breaking, it will first start leaking and you can detect the leak. That is what they are counting on, I believe, to be able to develop in order to have confidence it can run.

Chairman GLENN. The average civilian plant, we have been told—we had testimony to this effect—the average civilian plant goes into a forced shutdown mode maybe 6 times a year or something like that. In the DOE reactors, they have had forced shutdowns averaging 9 to 12 times per year. I do not know whether that is accurate; that is what we have had as testimony.

Dr. AHEARNE. Are you talking about scrams, Senator?

Chairman GLENN. I am sorry?

Dr. AHEARNE. Are you talking about scrams?

Chairman GLENN. Yes. Just forced shutdowns, yes.

In your opinion, in the defense complex, is that mainly a matter of the aged equipment, or is it a matter of procedures, again? Back to the human attitude toward this and the training that they have had, as compared to what you insisted on the civilian industry having when you were Chairman of NRC.

Dr. AHEARNE. Well, a scram usually is not so much a procedure, but it is the equipment taking over and forcing the reactor down. My committee had not—

Chairman GLENN. Which can come either from mechanical or from human error.

Dr. AHEARNE. Sure, sure. We had not really looked at that issue, other than I know the point had been made in one of our Committee discussions that a scram in a commercial reactor is a far more serious event than a scram in this kind of a reactor, because commercial reactor is operating at so much higher temperature and pressure, that when you suddenly try to stop that system, it is a

much more severe—the amount of energy that is there is much more difficult to dissipate than it is in these kinds of reactors.

I will also have to go on to point out that the U.S. plants are sort of infamous worldwide as having too many scrams. That is just the commercial side. And most countries have a much lower scram rate than even our commercial reactors, and the commercial world has been trying very hard to reduce it.

A high scram rate does not indicate that the plants are in good condition. They should not be having a high scram rate. It is an emergency procedure, and you should not have to have a lot of emergencies.

Chairman GLENN. But we have too many of those. Are we operating unsafely compared to other nations, then, in the civilian—

Dr. AHEARNE. Going to the civilian side, it has always been a concern of the NRC that our scram rate is too high. Because the analogy the NRC has made is that the startup and shutdown of a reactor are the two most hazardous times. And an automatic shutdown, which is an uncontrolled shutdown, is the worst hazard. As a consequence, you really try to run your reactors so you do not have lots of scrams.

Dr. MESERVE. My impression, Senator, is that there is a wide variability in the frequency of scrams among various commercial reactors. What really is a key is to examine why a reactor is scrambling and trying to get control of the situation and understand, once an event has occurred, why it has occurred. And you take appropriate actions to assure that there is not a recurrence.

As Dr. Ahearne has indicated, the production reactors have a more benign response to a scram than a commercial reactor typically would. Nonetheless, in all cases, you would want to understand why it occurred.

Chairman GLENN. Apparently, there is a lower scram rate in other countries. In France, 50 percent of their power comes from nuclear power now, or upwards of that.

Dr. AHEARNE. Oh, it is more than that. It is about 78 percent.

Chairman GLENN. Yes, 70-some. Okay, right. And they have a lower scram rate. How do they do it? Or do they have a lower scram rate? If so, how do they do it?

Dr. AHEARNE. Yes, they have a lower scram rate, as does Japan. Much greater attention to detail on design, standardized design, greater attention to maintenance, the kinds of steps that our industry is gradually moving to. As Dick just said, there is a great variability there. Some of our commercial plants have a very low scram rate. There are some that are very high.

Chairman GLENN. We can talk all day on some of these technical areas here, and I appreciate your bearing with me on that. We are going to have to end before too long.

Let me get back to this. The Office of Environment, Safety and Health over at DOE was put into effect a few years back after we had been bringing up some of these things over here. I do not know whether it was directly in response to some of the concerns expressed here, or whether it would have happened anyway. But in any event, it was put in at their own volition. We did not require it.

Should that be codified, or is it enough established now that we do not need to go through that legislation?

Dr. AHEARNE. Codification of a branch of a department is something that I think that your Committee has a lot more experience with. I think the more serious question is: Is its function likely to be strongly supported in the absence of the codification?

I know from my personal experience that the senior people, Salgado and Herrington, were giving, for example, Starosteki strong support.

Chairman GLENN. Yes, but will it ever be thus in future administrations?

Dr. AHEARNE. Well, what I was about to say is that one of the reasons they had to give him strong support is there are a lot of people in the system who were not. And so, obviously, implanting permanently an organization gives it at least a step up on the chance to get that kind of support. It does not guarantee it at all.

Chairman GLENN. It gives it a legitimacy it may not otherwise have, though.

Dr. AHEARNE. Right. But just being a legitimate organization does not guarantee that it is really going to have much clout. The people at the top have to decide that is important.

Chairman GLENN. It might be in a bit more jeopardy if it was not codified. So I do not see anything wrong with codifying it myself.

Dr. MESERVE. Mr. Chairman, I think that this might be an inappropriate time to codify, merely for the reason that through your very great substantial efforts, there is now this new entity that has been created, which is this oversight board. And exactly what role the ES&H part of Department of Energy should play now that there is a new and very significant component that is outside the department is something I think that the department and this Committee will have to think about very carefully in trying to re-define the things that the department should be doing and those things which might appropriately be the focus of the activities of the new oversight board.

I think that we are in a period of some uncertainty, and there is going to have to be a need to sort of examine how things are working. And it may well be necessary for the Congress to step in to deal with that matter. But I think we are at a time when we need to understand more.

Chairman GLENN. A recent article by the New York Times made note of the fact that there has been a serious decline in manpower quality in DOE. In other words, DOE has been losing and failing to recruit the very talented people they should have, particularly in this area.

Do you think that that is an important problem at DOE in terms of nuclear safety? And could you please elaborate on that, either one of you?

Dr. AHEARNE. Sure. It is always difficult to discuss people with whom you work, but I do not think there is any doubt that there has been an overall decline in quality in the DOE. How could it be otherwise when the previous President came in and said, as one of his programs, he was going to get rid of the department? And when the Secretary who was first there had as a principle high priority item to get rid of the department? Now, obviously, in that kind of

an environment, it is very difficult for very good people to decide this is a valuable place to be.

Second, it has always been difficult, I think, to have high quality people within the Department of Energy as long as there did not seem to be an overall energy policy. We are talking about the defense part of it, but it pervades the whole department. There was not much in the way of energy policy for the last 8 years either.

So it would be very hard for truly competent people, other than ones who had a really strong mission of public service. And there are some of those. But they get very frustrated and very weary. So I think that that is a very critical question.

The oversight or the management of a program depends on having people who understand the program. There are not very many people in the oversight and management sides of the department who really understand these kinds of programs they are trying to operate.

Chairman GLENN. How much do pay scales have to do with recruiting people? You know, we are a little jumpy on Capitol Hill about pay discussions at the moment. But is that a factor over there?

Dr. AHEARNE. I am not really a good judge of that. I spent 25 years in the Federal Government, and it is really—I would say that a far more important issue is: Do you have a clear mission that is well identified, you can support it, and the people at the top are supporting you in carrying that out, and the people at the top understand the business that you are supposed to be in? I think that is far more important than the pay scale.

Chairman GLENN. What do you think, Dr. Meserve? You have looked at that.

Dr. MESERVE. I share Dr. Ahearne's concerns. I think that there is not only the problem of the Department of Energy recruiting appropriate people; there is also a related problem, which is even broader, of developing people with the appropriate training. For a variety of societal factors that I do not fully understand, nuclear engineering is at the moment not a particularly popular subject for graduate students, at least for American citizens. And so we have certain critical areas like, for example, criticality safety, which is on the chemical processing side of these plants and is very important to safe operation, where we do not seem to be producing the people that would be available to be input into the system. So we have all the problems that Dr. Ahearne has so ably described, and we also have some difficulties in sort of generating the feedstock for these weapons facilities.

Dr. AHEARNE. There is one more positive sign I have seen. As a result not only of the formation of ES&H, but I think also because of Dick's report and the subsequent endorsement of it by the Deputy Secretary of Energy, I think the people that have come into ES&H out of the NRC and a more nuclear background are pretty good. I think that they have brought a much higher level of understanding of what safety means, of how to bring a safety philosophy in place, and I think you have seen that in some of the reports they have generated. But they are a small number of people.

Chairman GLENN. Dr. Meserve, the NAS report that has been referred to that your committee did in the fall of 1987 was instru-

mental in convincing DOE to begin to make changes in their reactor safety program. DOE has promised Congress that it will implement the recommendations of your committee. To date, as your testimony indicates, you have not examined the department's response to those recommendations in any detail. Do you plan to go back and review the department's response?

Dr. MESERVE. Senator Glenn, the Academy operates as a group of volunteers who come together to perform a particular task, and as is typical of the way the Academy Committees work, our task was completed upon the issuance of the reports. There really is not a mechanism for feedback in the way the Academy currently works.

I have been very interested—and I am sure all of the other members of the committee have been interested—in reading the Department of Energy's analysis of how it has responded to our reports. But we have not undertaken any detailed analysis and do not have—

Chairman GLENN. Since you have triggered some of those changes, maybe that would be something you would want to go back and take another look at, or convene another group or some of the same group to look at what you recommended before. It might be a very good follow-up to make sure that things are being done.

Once we have this defense nuclear facilities safety oversight board in place and/or your committee continues, whatever happens there, should part of the function of one or the other groups or both be to also oversee some of this cleanup that is going to be a 20- or 30-year job? Also, would you like to review safety at Pantex and the enrichment plants and some of the places that were left out specifically in our legislation?

Dr. AHEARNE. Well, as far as my committee is concerned, we are going to be working our way through all of the nuclear facilities. So we will be getting to those other facilities, also. And as Dr. Meserve had mentioned, we agreed this past year that we would continue looking at the so-called Class A reactors, and his committee would look at the other facilities. We are now starting down some of the other facilities, starting with Rocky Flats. So we will be going through those others.

As far as the oversight of the environmental cleanup is concerned, this obviously is just completely personal remarks. It appears to me that the magnitude of the effort that is involved there is not going to be able to be done without some strong coordination and oversight. It is just too big. You look at the size of the dollars you are talking about, and you realize that you have a potential swamping of what is called the Department of Energy. Certainly, if you take out the defense side, it is much larger than the rest of the Department of Energy. It is larger than EPA's budget. And that indicates that the possibility, the probability of having large amounts of resources spent with unsatisfactory results, that probability is very, very high.

Yes, I think there does have to be some kind of oversight monitoring of that. I am not sure how it is even going to be able to be handled at the moment, frankly, with the existing structures.

Chairman GLENN. Gentlemen, we are going to have to end, regrettably. As always, your testimony is extremely interesting, and I

am going to have to end. I would appreciate that if we have questions from other members of the committee that you respond in writing so it will be included in the record.

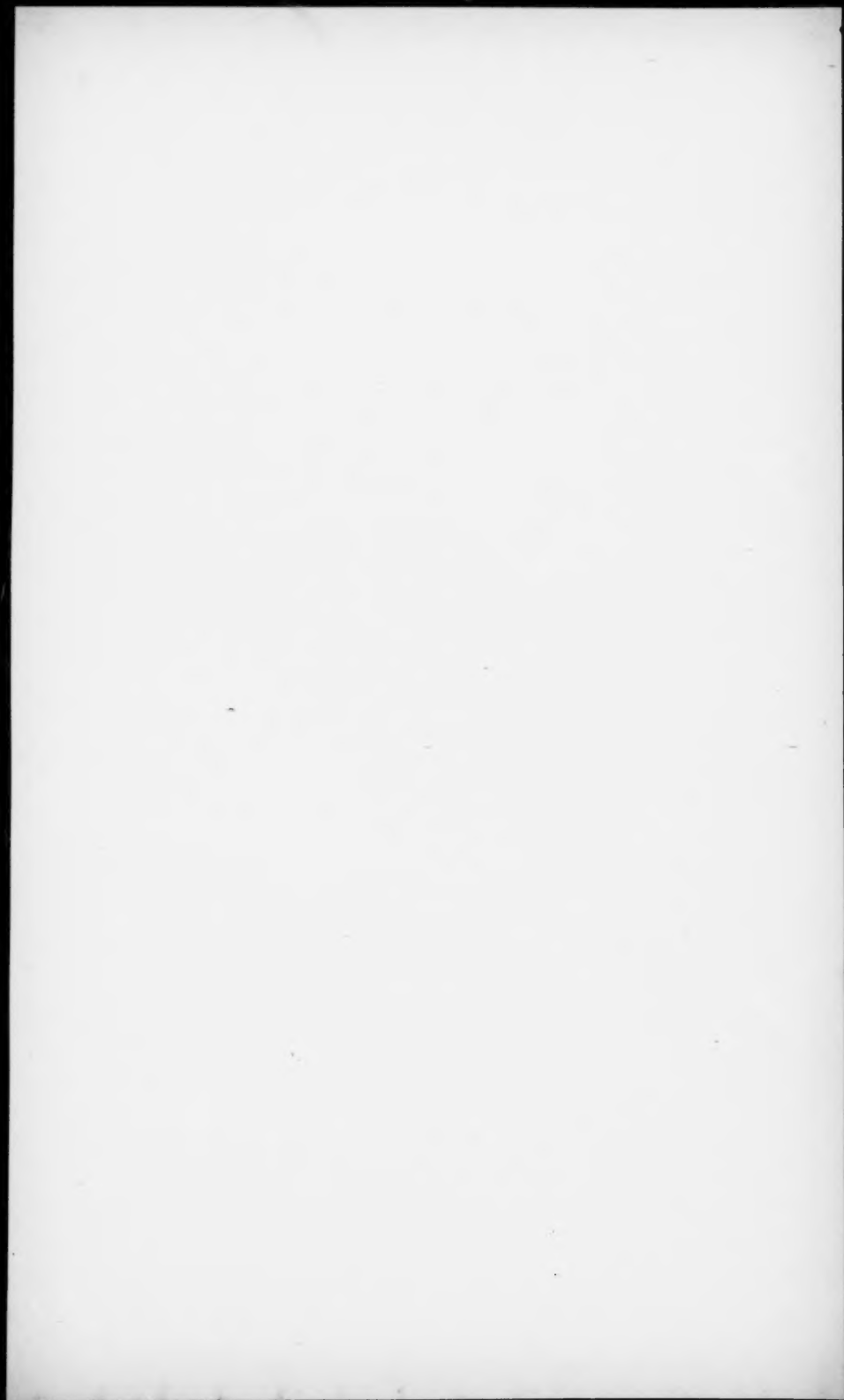
We appreciate your being here today. Thank you very much.

Dr. AHEARNE. Thank you, Mr. Chairman.

Dr. MESERVE. Thank you, Mr. Chairman.

Chairman GLENN. The hearing will stand in recess subject to the call of the Chair.

[Whereupon, at 12:37 p.m., the Committee adjourned subject to the call of the Chair.]



APPENDIX

United States General Accounting Office

GAO

Testimony

For Release
on Delivery
Expected at
9:30 a.m.
Wednesday
January 25, 1989

GAO's Views on DOE's Modernization
Plan for the Weapons Complex

Statement of J. Dexter Peach
Assistant Comptroller General
Resources, Community, and Economic
Development Division

Before the
Committee on Governmental Affairs
United States Senate



Mr. Chairman and Members of the Committee:

We are pleased to be here today to provide our views on the Department of Energy's (DOE) recently issued plan to modernize the nuclear weapons production complex. Since 1981, Mr. Chairman, GAO has issued over 50 products dealing with environmental, safety, and health problems associated with DOE's nuclear weapons complex.

About 2 years ago in testimony before this Committee--building on a body of GAO work that had been underway since 1981--we outlined numerous safety and environmental problems facing an aging nuclear weapons complex. We pointed out that DOE did not have an adequate plan for addressing the problems and assuring the Congress that it could meet the nation's need for nuclear material for weapons. We called on DOE to develop a strategic plan setting forth (1) the projected facility requirements for an updated nuclear weapons complex; (2) a comprehensive picture of the environmental, safety, and health issues that had to be addressed; and (3) a framework for prioritizing the billions of dollars in federal expenditures needed to remodel or build new facilities, as well as to clean up environmental contamination.

As we learned more about the significance of the problems facing DOE's nuclear complex, we revised the estimates of what it would cost to modernize and clean up the complex from billions to between \$100 billion and \$155 billion. Let me stress that while these estimates have evolved over the past few years, they are not

budget quality, but clearly illustrate the formidable size of the challenge ahead, and, as we have told you before, all indications are that the final cost of modernizing the complex could be higher than these estimates.

In December 1987, the Congress mandated that the President prepare a plan to modernize the nuclear weapons complex.¹ DOE delivered that plan to Congress early this January. Somewhat earlier, DOE issued a separate report detailing the environmental, health, and safety needs of all of its facilities, including the nuclear weapons complex.

Since the hearings you held 2 years ago, as well as several others conducted by you and others, DOE recognized through public statements and now through these reports that serious problems exist within its complex. In fact, while DOE was further identifying or characterizing the extent of the problems in the complex, several safety problems surfaced which have in effect shut down the nation's ability to produce nuclear material for weapons. These problems include:

-- In January 1987, the N-reactor was temporarily shut down to upgrade safety systems. Safety upgrades have now been

¹National Defense Authorization Act for Fiscal Years 1988/1989 (P.L. 100-180, Dec. 4, 1987).

suspended, and the reactor is being maintained in cold standby status, with no plans for restarting it.

- In August 1988, the P-reactor at Savannah River was shut down amid concerns about the need for improvement in operator training and procedures, technical specifications, and DOE and contractor management of reactor operations. Subsequently, evidence of cracks in the primary cooling systems of the reactors has surfaced. This is in addition to the problems of the emergency core cooling system and the continuing need for ultrasonic testing of the reactor tanks, both of which we highlighted before this Committee in March 1987. All three reactors are down while DOE finalizes its plan to address these and other concerns. DOE presently plans to restart at least one of the three reactors near the end of this year.

- In October 1988, a major plutonium processing building at Rocky Flats was shut down because of safety concerns. DOE plans to resume operations at this facility sometime this spring.

DOE has also begun to learn more about the extent of environmental, health, and safety problems within the complex. Actions in the last year by DOE to hire technically qualified staff to investigate and report on the extent of contamination and safety

problems that need to be addressed has been a real plus. While it is encouraging that DOE has a program to assign permanent resident inspectors at its major facilities, we note that permanent inspectors have only been assigned at Savannah River and Rocky Flats, with one inspector on loan to Fernald until someone permanent can be hired. These inspectors have been instrumental in disclosing significant safety problems at these facilities within the past several months and clearly have proven the worth of having resident inspectors at major weapons complex facilities.

As we begin this session of Congress, the important point is that the debate can now move from recognition that there are serious problems in the nuclear weapons complex to how we can best deal with the problems. Your persistence for better information has been instrumental, Mr. Chairman, in the development of the two recent DOE reports which provide a beginning framework for the debate. The remainder of my testimony today provides perspective on the scope and direction of DOE's modernization and cleanup plans, the reasonableness of the cost estimates to address these plans, and the structure needed to most effectively and efficiently resolve the problems.

DOE FOCUSES ON MODERNIZATION

DOE must deal with modernizing its aging complex because of past mistakes--overemphasis on production, negligence in the

environmental area, and complacency with regard to safety. While the modernization plan lays out DOE's view of what facilities will be needed in 2010 to meet production needs, it does not clearly define what environmental cleanup problems will be resolved during the same time frame. In addition, DOE's view of the complex will likely change as the Congress assesses the plan and further information is developed.

By 2010, if the plan is followed, DOE will have upgraded many of its plants, including the plutonium infrastructure at the Savannah River Plant and uranium facilities at the Y-12 plant. DOE will have two new production reactors and a Special Isotope Separation Facility. Finally, DOE will have largely relocated and/or phased out other installations such as the Rocky Flats Plant and Fernald. In our reading of the plan, it appears that modernization activities would essentially be completed by 2010 and the nation would have a revitalized weapons complex. However, problems in the environmental area would still be with us. In our opinion, the plan does not adequately address the cleanup of existing facilities and decontamination of facilities as they are retired from service. The plan provides little perspective on how these important problem areas will be solved or what needs to be done in these areas between now and 2010.

While the plan does provide DOE's views on the future configuration of the complex, it is just a first step that raises

a series of issues the Congress will need to consider. For example:

- Does the nation need two new production reactors? DOE's plan calls for two reactors as a top priority. Reactors will be built at different sites and one will utilize a new technology.
- Does DOE have the capability to meet nuclear material needs while the new reactors are being built? Currently all DOE's production reactors are shut down. It is unclear to what extent the reactors can be relied upon in the future to produce nuclear material.
- Should the special isotope separation facility be a priority activity? DOE's plan places high priority on this project which is to be used to convert fuel-grade plutonium to weapons-grade plutonium. Given the other planned upgrades of plutonium facilities within the complex, questions regarding the emphasis placed on these facilities need to be addressed.
- Are DOE's plans to upgrade facilities which it plans to later phase out appropriate? DOE's plan calls for a number of upgrades at facilities it plans to shut down within

several years. The trade-offs between upgrade and shut down need to be carefully studied.

In addition to these and other questions, DOE's views on how the complex will look in 2010 may be significantly altered as additional information becomes available. For example, a report within DOE proposes that a linear accelerator could provide tritium more cheaply and sooner than a new production reactor. Such information could greatly change the direction of DOE's plan.

In our view, as pictured by DOE in its plan, modernization is on a faster track than environmental cleanup and decontamination. DOE still has not made key decisions on the extent of environmental cleanup or which sites get cleaned up first. Also, the plan raises new issues that the Congress must consider in addition to balancing modernization and cleanup needs. Accordingly, we believe the plan should only be viewed as a first step in establishing a national consensus to rebuild and clean up the complex.

COST ESTIMATES VERY UNCERTAIN

The second issue I want to briefly discuss is the reasonableness of the cost estimates set forth in DOE's recent reports. In 1986, we reported that it would cost billions to address problems within the complex. In 1987, we reported that the estimates had grown to tens of billions of dollars. In 1988,

we reported the cost would likely be over \$100 billion to address the major problem areas within the complex. Today, we have three studies before us which suggest or specify costs far in excess of \$100 billion: (1) the GAO report entitled Dealing with Major Problem Areas in the Nuclear Defense Complex Expected to Cost Over \$100 Billion, issued in July 1988;² (2) DOE's Nuclear Weapons Complex Modernization Report, issued by the President in January 1989;³ and (3) DOE's Environmental, Safety, and Health Needs Report, issued in December 1988.⁴

Of all three reports, we believe our report of July 1988, which provides cost estimates ranging from \$100 billion to over \$155 billion, to be the most comprehensive. The DOE studies differ from GAO's in their methodology and scope. For example, the DOE modernization report highlights \$81 billion for modernization and environmental restoration over the next 21 years. This \$81 billion represents the additional funds (an increment) needed during the next 21 years over and beyond funding DOE programs each year at the fiscal year 1989 level. For example, DOE already has a large radioactive waste management program underway--currently allocated

²Dealing With Major Problem Areas in the Nuclear Defense Complex Expected to Cost Over \$100 Billion (GAO/RCED-88-197BR, July 6, 1988).

³United States Department of Energy Nuclear Weapons Complex Modernization Report (Report to the Congress by the President, December 1988).

⁴Environmental, Safety, and Health Needs of the U.S. Department of Energy (U.S. Department of Energy, December 1988).

at more than half a billion dollars a year. The amount specified in the plan for this program--\$7.5 billion--reflects only the additional costs needed above the half billion dollar annual expenditure for each of the next 21 years. Further, the \$81 billion only represents cost through 2010. In the environmental restoration area, DOE recognized that costs would extend beyond 2010 and, in total, will range from \$40-70 billion. The DOE Environmental, Safety, and Health Needs report differs from the GAO report primarily because it does not address modernization activities. (Appendixes I and II provide a detailed comparison of DOE's reports with GAO's.)

It is important to note that all of these estimates are not budget quality and are designed only to roughly approximate the funds needed. In the final analysis, the true cost may be far higher. Many uncertainties exist with regard to how we can clean up existing environmental contamination and decontaminate large nuclear facilities. DOE's modernization plan does not shed much light on the extent DOE's sites will be cleaned up or what cleanup procedures will be used. Some of the planned facilities will utilize new technologies such as the isotope separation facility and the high temperature gas-cooled reactor. DOE's construction of such facilities has been prone to huge cost overruns. Further, the experience in building commercial reactors indicates that the cost of new production reactors could be much higher than DOE's estimate of \$6.6 billion for two reactors.

Finally, we are not sure that all the problems within the complex have surfaced. For example, DOE still has not applied a detailed safety policy with accompanying standards throughout its complex. Once this is accomplished, it would likely reveal needed safety upgrades. In the environmental area, uncertainty still persists not only regarding the size of problems but also regarding the extent to which DOE sites will be cleaned up. Some locations may be irreversibly contaminated.

DOE's STRUCTURE

The last key issue is whether DOE is properly structured to manage this massive rebuilding effort, which we have discussed as one of the largest industrial rehabilitation programs ever undertaken. This is important to ensure that past mistakes are not repeated. Some changes in DOE's current structure may be warranted to acquire the necessary technical expertise, provide strong safety oversight, and establish needed policies and procedures as a basis to manage the modernization effort.

In regard to technical expertise, in 1981, a DOE task force looking at the Three Mile Island accident criticized DOE for not having sufficient technical resources to manage its nuclear facilities. This criticism was repeated in the October 1987 National Academy of Sciences report on DOE's production reactors. Sufficient technical resources are needed to undertake the

modernization effort--upgrading existing facilities and building new ones. In addition, DOE must continue to hire quality technical people to manage and oversee ongoing operations. For example, the Office of the Assistant Secretary for Environment, Safety, and Health must continue its program to place resident inspectors at DOE facilities. As I noted earlier in my statement, these inspectors have been key to understanding and characterizing safety problems. However, we still believe the question is open as to whether DOE has sufficient technical expertise to accomplish all the tasks ahead.

In addition, we have long supported the need for an independent organization outside the control of DOE that oversees the agency's internal safety program. Public Law 100-456 created such an entity--the Defense Nuclear Facilities Safety Board--but we are concerned that the law excludes certain weapons facilities from the Board's oversight, including Pantex and the Nevada Test Site.

Finally, all the necessary policies and standards are not currently in place to guide the modernization effort. For example, in our July 1988 report on the oversight of DOE's nuclear facilities, we recommended that DOE establish a meaningful safety policy, related standards and implementation policies to guide continued operation of its facilities.⁵ The policies and standards

⁵Oversight at DOE's Nuclear Facilities Can Be Strengthened (GAO/RCED-88-137, July 8, 1988).

can also be used as a baseline safety criteria for developing the future strategy for the weapons complex. A DOE safety policy has been in draft since May 1988. DOE believes it will be issued in a few months. The detailed implementing procedures are expected to be issued sometime after the policy. Once they are in place, DOE will apply them to existing facilities and to the design for new facilities. This probably will entail safety upgrades, which may increase the costs estimated in the 2010 modernization plan.

As the debate continues, other questions concerning DOE's structure will be raised. These could include: (1) Is DOE's current organizational structure for managing its nuclear complex appropriate? For example, to ensure that there is proper balance between production and the environment, should DOE establish a separate office to manage the environmental cleanup effort? (2) Should safety upgrades be separated from operational funds in the budget, like DOE has separated environmental cleanup, so that the level of funding for safety and specific safety-related projects can be separately tracked?

SUMMARY

The 2010 modernization plan brings DOE and the Congress to an important crossroad--that of making critical decisions about the balance between restructuring its aging weapons complex to provide new and expanded production capability; assuring that new and

existing facilities meet environmental, safety, and health laws and regulations; and cleaning up the result of years of environmental contamination. Congress must make these decisions within the framework of the conflicting demands for limited resources necessitated by the budget deficit, while recognizing that the nuclear material from the complex is critical to our national defense.

The 2010 modernization plan is a first step in framing the debate. Today, we have a better understanding of the problems facing the complex. However, DOE is continuing to develop information on the extent of the problems and to address and prioritize what needs to be done to correct them. While all the problems are not yet completely understood, the national debate can now widen to finding solutions. Because of the enormous costs associated with the solutions, the Congress will be making decisions about the complex for many years.

DOE can assist the Congress in its deliberations in future years by periodically updating the 2010 modernization plan. Safety upgrades resulting from the application of the safety policy and reprioritization of environmental cleanup activities resulting from completing the environmental surveys are just two reasons for an update. Such an update would keep the Congress and the public informed on the overall direction, priorities, and progress DOE is making as the modernization effort continues. Any subsequent plan

should also include a discussion of how DOE is structured to ensure that all operations are safely carried out in an environmentally acceptable manner.

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Thank you, that concludes my testimony. We would be happy to answer any questions.

APPENDIX I

APPENDIX I

COMPARISON OF GAO'S REPORT
WITH DOE 2010 MODERNIZATION REPORT

	<u>Estimate in:</u>		<u>Explanation of major differences</u>
	<u>GAO July report</u>	<u>DOE 2010 report^a</u> (dollars in billions)	
<u>DEFENSE COMPLEX</u>			
Upgrading existing capabilities plus modernization	\$ 35- 45	\$44.7	GAO has not had the opportunity to review the supporting documentation to 2010 study.
Disposal of radioactive waste	\$ 30	\$ 7.5	DOE's estimate reflects the incremental cost. It does not include costs beyond 2010.
Decontamination	\$ 15	\$ 4.7	DOE's estimate reflects the incremental cost. Further, it does not include active facilities and does not include costs beyond 2010.
Environmental restoration	\$ 35-65	\$24.1	DOE's estimate does not include costs beyond 2010. ^b
Total	<u>\$115-155</u>	<u>\$81.0</u>	

^aIncremental costs represent the additional funds needed during the next 21 years over and beyond funding DOE programs each year at the fiscal year 1989 level.

^bThe plan does acknowledge that the total cost could be between \$40 billion and \$70 billion.

APPENDIX II

APPENDIX II

COMPARISON OF GAO'S REPORT
WITH DOE NEEDS REPORT (12/88)

	<u>GAO July report</u> (dollars in billions)	<u>DOE needs study</u>	<u>Explanation of major differences</u>
<u>DEFENSE COMPLEX</u>			
Upgrading existing capabilities plus modernization	\$35-45	\$6.5-13.4	DOE's estimate does not include modernization.
Disposal of radioactive waste	\$30	\$4.0-4.7	DOE's study does not include waste fees or ongoing interim storage activities.
Decontamination	\$15	\$2.5-4.3	DOE's estimate includes only those facilities presently designated inactive.
Environmental restoration	\$35-65	\$34.6-63.0	These estimates are essentially comparable.
<u>NON-DEFENSE FACILITIES</u>			
ES&H Cost	-0-	\$5.6-6.2	GAO estimate relates only to the nuclear defense complex.
Total	<u>\$115-155</u>	<u>\$53.4-91.6</u>	

Note: Numbers may not add due to rounding.

STATEMENT OF
TROY E. WADE II
ACTING ASSISTANT SECRETARY FOR DEFENSE PROGRAMS
U. S. DEPARTMENT OF ENERGY
BEFORE THE
SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS
JANUARY 25, 1989

Mr. Chairman, on behalf of the Department of Energy, I am pleased to appear before you to discuss the items outlined in your letter of January 6, 1989.

I am accompanied by Peter N. Brush, the Acting Assistant Secretary for Environment, Safety, and Health.

You requested discussion of the Department's nuclear weapons production complex, specifically related to the FY 1990 budget request for environmental cleanup and modernization, the integration of various reports that have recently been submitted to your committee and other committees of the Congress, and the status of various safety and health activities.

The Department has issued four major reports in the last year dealing with environment, safety, and health needs, preliminary Departmental rankings of the those environmental needs, and the need to modernize the nuclear weapons complex to assure the Department's ability to respond to national security needs.

ENVIRONMENTAL SURVEY

The "Environmental Survey Preliminary Summary Report of the Defense Production Facilities" provides a preliminary ranking of findings from the Environmental Survey at the Department's sixteen defense production facilities and is based on potential impacts to public health and the environment. The report will be

finalized later this year with the inclusion of results from the Survey's sampling and analysis program, updates on the preliminary findings, and information on other Departmental sites.

The preliminary report is useful to management in developing long-range plans for remedial and corrective actions by providing an independent assessment of the Department's environmental problems. Compliance schedules and other regulatory concerns are identified, but not factored into the preliminary report. Each of the findings in the preliminary reports has already been considered by the Department and addressed by the site-specific long-range plans.

The problems and rankings are subject to modification based on the results of site technical reviews and the sampling and analysis phase of the survey. These and other concerns will be factored into eventual plans for corrective action, subsequent to review and analysis of the final Environmental Survey for each site.

ENVIRONMENT, SAFETY, AND HEALTH NEEDS ASSESSMENT

In June 1987, during an appearance before this committee, then Deputy Secretary Salgado agreed to provide a report addressing environment, safety, and health needs at the Department's defense-related sites. Last January, the scope of this original assessment was expanded to include all Departmental facilities through an additional report.

The needs report for the defense-related sites was submitted to Congress in July 1988 and the Department-wide needs assessment was submitted to Congress this month. The Department-wide report updated the defense complex information and expanded the scope to include radioactive waste management and decontamination and decommissioning activities. It presents projected activities and resources that would be needed to ensure that all 45 major Department sites and certain special projects and programs meet environment, safety, and health requirements.

Various categories are included in the report. Day-to-day environment, safety, health, and radioactive waste management operations could average about \$1.8 billion per year. Corrective actions -- those activities designed to bring operating facilities into compliance with existing requirements -- could require another \$7.1 to \$14.2 billion, depending on what actions are chosen to address known problems. Environmental remedial actions -- the cleanup of inactive waste sites -- include assessment, characterization, design, and eventual cleanup of environmental contamination. This cleanup effort could require between \$35.4 and \$64.0 billion to complete.

The report also includes activities that provide benefits and improvements to the environment, safety, and health posture of the Department, but are not directly associated with the cleanup and compliance actions. These include decontamination and decommissioning of inactive facilities that are contaminated with radioactivity; projects to safely manage and dispose of radioactive wastes generated by facility operations; and projects that Congress has specifically legislated to address cleanup of sites that were not part of the Department's past operations.

It is important to note that the needs assessment is not a planning or budget document. Detailed analysis of the needs, along with validation, review, prioritization, funding, and program planning was outside the scope of the reports.

MODERNIZATION OF THE NUCLEAR WEAPONS COMPLEX

As this committee is well aware, many portions of the nuclear weapons complex are over forty years old. Many of the problems and actions already discussed are a direct result of the aging and increasingly fragile condition of our production facilities. The Congress directed in Section 3132 of Public Law 100-180 that a study be conducted and a plan prepared by the President for the modernization of the nuclear weapons complex, that takes into account the overall size and productive capacity necessary to support national security objectives.

The President directed the Secretary of Energy, in consultation with the Secretary of Defense, to conduct the study and prepare a report. The Energy Secretary appointed a Steering Committee composed of representatives from the Department of Energy, the Department of Defense, the Joint Chiefs of Staff, and the National Security Council to oversee a Task Force study and preparation of an implementation plan and investment strategy. This study has been completed and the report has been transmitted by the President to the congress.

The study shows that the entire nuclear weapons complex will require extensive modernization and maintenance over the next fifteen to twenty years and beyond

in order to meet national security obligations well into the next century. The study recommends new production reactor capacity, plant consolidations, closures and relocations of some sites, and upgrading of the remaining configuration of the complex. The study also recognizes that the costs for environmental restoration will be significant during the period of modernization.

The report indicates that through 2010, the incremental investment to modernize the nuclear weapons complex and address environmental cleanup is estimated to be \$81 billion. The specifics of that estimate are \$52 billion for the modernization initiatives themselves (\$25 billion for capital investment and \$27 billion for programmatic operations) and \$29 billion for environmental restoration. This is in addition to about \$163 billion that would be necessary just to continue programmatic operations at existing facilities.

FY 1990 BUDGET REQUEST

The Reagan Administration's budget request for FY 1990 reflects a total of \$9.0 billion for Atomic Energy Defense Activities within the Department of Energy. This total will fund the primary responsibilities of the Department in support of its national security mission, as well as taking the first steps toward modernization and cleanup of the nuclear weapons complex. This funding level successfully balances all of our statutory requirements within existing fiscal constraints.

Modernization of the nuclear weapons complex, the cleanup of environmental problems, and achieving compliance with applicable environment, safety, and

health regulations, standards, and objectives is essential if the Department is to maintain the nuclear stockpile and its future weapons production capability.

The FY 1990 request includes \$3.3 billion for modernization initiatives and environment, safety, and health activities. This is an increase of 28% over the FY 1989 levels, compared to a total increase of only 3.9% for all other program activities within the Atomic Energy Defense Activities account. The specific activities supported by the FY 1990 budget request for modernization and environment, safety, and health activities are outlined in the table on the following page.

The Department's \$2.0 billion request for environment, safety, and health and waste management efforts includes a near doubling of the amount for cleanup to \$315 million. These environment, safety, and health activities are consistent with the needs identified in the needs assessment report provided to the Congress earlier this month.

As I noted in my letter to you of December 28, 1988, there has been much publicity associated with the extent of the necessary environmental cleanup at defense complex sites. Most of the publicity has been critical and little recognition has been given to the environmental accomplishments of the past decade. We have been moving ahead to address those past problems and some of those accomplishments are highlighted in the enclosure to that letter. I request that a copy of that enclosure be inserted in the hearing record.

Facilities Modernization and Environment, Safety, and Health

(Dollars in Millions)

	<u>FY 1988</u>	<u>FY 1989</u>	<u>FY 1990</u>
Atomic Energy Defense Activities Total	\$ 7,749	\$ 8,100	\$ 9,027
Included in above totals:			
<u>Environment, Safety and Health</u>			
Environmental Compliance	\$ 505	\$ 559	\$ 572
Environmental Cleanup	98	159	315
Safety and Health	<u>412</u>	<u>432</u>	<u>528</u>
Subtotal	\$ 1,015	\$ 1,150	\$ 1,415
<u>Defense Waste activities</u>	\$ 619	\$ 596	\$ 575
Total, Environment, Safety, and Health	\$ 1,634	\$ 1,746	\$ 1,990
<u>Facilities "Modernization"</u>			
Two New Production Reactors	\$ 20	\$ 60	\$ 304
Special Isotope Separation	90	101	196
Rocky Flats Upgrade (Bldg. 371)	0	4	45
Revitalization of Research, Development and Testing Complex	62	79	95
Revitalization of Weapons Production Plants	92	79	83
Revitalization at Materials Production Facilities	66	78	82
New Tritium Loading Facility at Savannah River	44	32	24
High Explosive Machining Project, Pantex	3	13	36
All other General Plant Projects and Capital Equipment	<u>366</u>	<u>396</u>	<u>447</u>
Total, Facilities Modernization	\$ 743	\$ 842	\$ 1,312
GRAND TOTAL	\$ 2,377	\$ 2,588	\$ 3,302

The \$1.3 billion request associated with the modernization of the nuclear weapons complex is consistent with the recommendations recently submitted to the Congress by President Reagan. The FY 1990 increment allows us to move ahead with the necessary efforts outlined in the report and includes among other items New Production Reactor capacity, which increases from \$60 to \$304 million, and the Special Isotope Separation project, which increases from \$101 to \$196 million.

STATUS OF FACILITY OPERATIONS

We have been aggressively addressing safety and management concerns at all of our defense facilities for a number of years. Some actions involve tightening management procedures or improving worker attitudes and some involve significant budget resources.

Savannah River Plant

The Department's defense nuclear reactors are not currently operating. Management attention is focused on restarting those necessary reactors only subsequent to a thorough review and approval process. A short history of the reactor situation will help put the Department's concerns into perspective.

In April 1988, the P reactor was shut down for evaluation and upgrade of the seismic capability of its safety systems following the discovery of a potential deficiency in a brace in the L reactor. At the same time, K reactor was shut down for a normal scheduled refueling and planned maintenance outage.

When attempts were made to restart P reactor, the effort revealed problems in the operations at the Savannah River Plant, which now require management and operating improvements before we restart any of the reactors. These improvements are now underway and the Department will restart the reactors only when the improvements are made, verified, and we are satisfied that they will result in continued safe operations.

The Department is following a course of action which entails both near-term actions, which must be completed prior to restart, and long-term actions which focus on the long-term safe and reliable operation of the existing reactors.

Near-term actions will assure that there is competent and experienced management for safe reactor operations. The safety culture is undergoing change with extensive procedure revision and related training associated with disciplined reactor operations. The transition of management and operating responsibilities to Westinghouse will bring access to resources with extensive nuclear experience. Focusing experienced resources to develop a strong management team is the key to future success.

The Department is focusing its efforts on the restart of the K reactor. The specific schedule for the restart of K reactor is expected to be defined and announced in March of this year. The lessons learned at K reactor will be applied to the other defense reactors.

The long-term integrated evaluation and upgrade program, the Reactor Safety Improvement Program, will define a phased program of safety improvements over the next several years to assure long-term safe operation of the defense reactors. Long term objectives are being identified, and the detailed safety improvement program will be relied upon to guide the integration of the specific issues with budgetary and schedule considerations.

The Assistant Secretary for Defense Programs has the responsibility to ensure that the restart program is successfully implemented. Independent oversight and verification of the restart operations is being performed by the Assistant

Secretary for Environment, Safety, and Health. The Advisory Committee on Nuclear Facility Safety is also providing important and independent recommendations regarding the defense reactors.

The Department is committed to the continued safe operation of the reactors. The reactors will not be operated until the Department determines that they satisfactorily meet the safety criteria established for restart and can thus be operated in a safe manner.

Rocky Flats Plant

Since 1986, the Department has conducted three Technical Safety Appraisals at Rocky Flats. Action plans have been developed to correct all 230 deficiencies that were identified in those three appraisals. To date, 140 of the recommendations have been implemented. The remaining 90 recommendations, which encompass long term construction, have been prioritized and are being planned. A fourth Technical Safety Appraisal of the Rocky Flats Plant is currently being planned to update facility status.

Extensive safety analyses and probabilistic risk assessments have been performed to evaluate the potential effect of seismic and other natural phenomena. Although these safety studies indicate that typical earthquakes expected at Rocky Flats do not present an undue risk of damage to the facilities, a structural upgrade to the plutonium facilities is underway and will provide an increased safety margin.

The Department's suspension of activities at a plutonium processing operation (Building 771) was an action intended to ensure that there is no unnecessary health risk to Rocky Flats workers. Aggressive actions have been taken to

ensure that building operations were not restarted until all necessary procedures and surface contamination standards had been thoroughly reviewed and verified. Quality assurance and management reviews were conducted before a phased restart was authorized on January 19, 1989.

FERNALD DOSE RECONSTRUCTION STUDY

In April 1985, Senator Glenn requested a study from the Centers for Disease Control on whether an off-site epidemiological study is appropriate for the vicinity of the Feed Materials Production Center located in Fernald, Ohio.

Since that time, the Centers for Disease Control and the Department have been involved in determining the volumes of historical discharges to the environment resulting from plant operations. Updated emissions data have been researched since 1985, with additional release data determined and included in a December 1988 transmittal to the Centers for Disease Control and the Environmental Protection Agency. At this time, those organizations are reviewing the additional data for potential use in the Fernald dose assessment calculations.

The Department is seeking an independent peer review of the revised data to assure adequacy for use in the eventual Fernald dose assessment study.

DEPARTMENTAL HEALTH STUDIES

The Department sponsors a program of epidemiologic research on the potential health effects related to energy generation and use, to nuclear medicine procedures, and to the operation of the Department's facilities. The purpose

of these studies is to determine whether or not workers are at an increased risk of mortality because of their employment in a Departmental facility.

Several ongoing studies are addressing the potential linkage between radon and lung cancer. One study is investigating the possible relationship between lung cancer and exposure to radon in the home. This study is one of the largest and most comprehensive of its kind and, during the past year, extensive field work was begun. The study is expected to be completed in about 5 years. Another study will provide information on the geographic relationship between radon and lung cancer. In addition, a study of lung cancer among New Mexico uranium miners who have been exposed to radon has recently been completed and a draft report is in preparation.

The Department is also sponsoring an epidemiologic investigation of workers at eight shipyards servicing nuclear vessels. This study has now been completed and a final report is expected shortly. The study comprises one of the largest cohorts of workers chronically exposed to low levels of external gamma radiation and should substantially add to our knowledge of the possible health effects related to such exposure.

The largest component of the Department's epidemiologic research program involves studies of workers employed at some time by the Department, its predecessor agencies, or its contractors. These studies, which will eventually encompass some 76 facilities and 600,000 workers, are conducted for the Department by various scientific personnel at laboratories and universities. The studies utilize data derived from payroll, dosimetry, work history, and security records collected during the normal operation of

facilities and information from death certificates obtained under very restrictive agreements with most of the States.

Approximately half of the 600,000 workers are included in the populations now being studied. These groups comprise workers at various production and research and development facilities operated through the Oak Ridge Operations complex; Hanford; the gaseous diffusion plants in Tennessee, Kentucky, and Ohio; the Lawrence laboratories in California, and former Manhattan Engineer District sites. Another study is focusing on plutonium-related health effects among workers at Department facilities in Los Alamos, Rocky Flats, Mound, Pantex, and Sandia.

Results from all of these ongoing and future studies receive independent peer review and are published in reputable scientific journals. During the past year, ten scientific articles have been published. The Department is developing plans to accelerate the collection of all remaining data on its workers and to compile and centralize these data.

This concludes my written statement. I will be pleased to respond to any questions you may have at this time.

QUESTIONS FROM CHAIRMAN GLENN

FY 1990 Request for Environment, Safety and Health Activities

Question 1: DOE's new budget submission for Fiscal Year 1990 requests about \$1.7 billion for environmental compliance, environmental cleanup, and safety and health activities. GAO suggests that \$5-8 billion may be needed annually to effect cleanup. Please explain why the DOE budget request is only \$1.7 billion.

Answer: The fiscal year 1990 budget request provides a major step in addressing the needs of the complex for this area. For example, funding for cleanup activities increases from \$159 million appropriated for fiscal year 1989 to \$401 million in fiscal year 1990, a 150 percent increase. The level requested reflects all DOE believes can be efficiently spent in fiscal year 1990. The Secretary has initiated efforts to develop an aggressive 5-year plan to address prioritization of our environmental and waste activities by site. This plan will reaffirm our fiscal year 1990 program and provide a firmer basis for the fiscal year 1991 program and out year budget requests. We do not think we will be able to make better estimates until the job of characterizing and prioritizing the DOE sites is completed.

QUESTIONS FROM CHAIRMAN GLENN

Question 2: Of the \$1.7 billion about \$401 million is earmarked for cleanup. Can you provide the Committee with a site-by-site breakdown of what that money will be spent on and the criteria for its distribution? What relationship does this distribution have to the Prioritization Report?

Answer: A site-by-site breakdown and description of tasks relevant to the \$401 million earmarked for cleanup is provided below. Criteria used to determine the distribution included level of public risk; regulatory responsiveness as reflected by commitments, terms, and conditions in compliance agreements, consent decrees, court orders, and other regulatory instruments of enforcement; and protection of the Defense Programs mission.

Mr. Leo Duffy, as Special Assistant for Coordination of Department of Energy Defense Waste Management, is currently directing the preparation of an integrated 5-Year Cleanup Plan to characterize and prioritize all cleanup activities at the Department's sites. This plan will coordinate and consolidate all Department cleanup activities into a single, integrated plan of action. This plan will also be used to reaffirm FY 1990 programs, as well as to provide a baseline for FY 1991 programs and budget requests.

DEPARTMENT OF ENERGY
ATOMIC ENERGY DEFENCE ACTIVITIES
(DOLLARS IN THOUSANDS)

FY 1990 Environmental Cleanup Site Activities

Albuquerque

\$ 46,583

Kansas City Plant - complete remedial investigation/feasibility study (RI/FS) activities and remove or treat additional polychlorinated biphenyl (PCB) contaminated soils. (\$2,236)

Los Alamos - continue ongoing RI/FS and initiate RI/FS for remaining sites. Perform closure activities at TA-16 Area P landfill and remedial actions at TA-54 areas and TA-40 explosive detonation site. Complete sampling plans and Recon Reports on Approximately 25 solid waste management units to support Part B RCRA permit requirements. (\$7,480)

Mound - continue RI/FS for spill, release, and disposal sites consistent with negotiations with EPA and the state of Ohio, and initiate interim groundwater cleanup measures. Initiate interim remedial actions at sanitary landfill and organic chemical contamination areas. (\$10,266)

Pantex - complete characterization and select remedial alternatives at waste sites. Continue RI/FS on spill, release and disposal sites including playas and ditches. Begin remedial actions at gasoline leak sites and, if possible, at the chemical burn pit. (\$3,501)

Pinellas - continue groundwater cleanup at 4.5 acre site, conduct remedial design at northeast site and initiate remedial actions at miscellaneous release sites. (\$700)

Rocky Flats - complete FS on Rocky Flats additional sites and continue RIs and designs for closure of landfill and solar ponds. Continue conversion of solar pond sludge to pond crete and dispose of material. Continue remedial actions at 881 Hillside site, and initiate additional closure actions. (\$17,850)

Sandia National Laboratory (SNL) - continue SNL - Albuquerque (A) RI/FS activities at TA-3, TA-5, Coyote Canyon Blast Area, Thunder Range and other areas. Complete closure of SNL-A chemical waste landfill and continue design for closure of radioactive mixed waste landfill. Initiate remedial design and cleanup action on fuel oil spill at SNL-Livermore. (\$4,550)

Chicago

\$ 2,900

Continues required surveillance and maintenance of inactive facilities at New Brunswick Laboratory. Initiates removal of pitchblend soils at New Brunswick Laboratory.

Idaho National Engineering Laboratory

\$ 46,488

Radioactive Waste Management Complex (RWMC) - continue characterization of buried waste and assessment of potential remedial technologies. Complete design of buried waste retrieval containment structure and retrieval system equipment. Complete interim cover enhancements and ditch liner system. Conduct full scale insitu vitrification test on non-radioactive waste form. Place vapor vacuum extraction units in multiple boreholes to remove volatile organics from the vadose zone beneath the subsurface disposal area. Provides for assessment of environmental restoration activities by the State of Idaho.

Consent Order Compliance Agreement (COCA) - conduct characterization efforts on ten land disposal units (LDUs), and initiate closures at six LDUs, including the Test Reactor Area (TRA) chemical waste pond. Complete cleanup of Idaho Chemical Processing Plant (ICPP) gravel pits 1 and 2 and tank farm contaminated soil area. Complete RIs for TRA warm waste pond and Test Area North groundwater contamination. Complete installation of groundwater monitoring system at Central Facilities Area Landfills II and III.

Nevada Test Site

\$ 2,630

Complete closure of three inactive mixed waste facilities: the Area 6 decontamination pond, Area 23 Building 650 leachfield and U3AX mixed waste landfill. Continue the RI/FS for the Yucca Flat underground test area and continue development of remedial methods to address plutonium surface contamination.

Oak Ridge

\$117,745

Oak Ridge National Laboratory (ORNL) - initiate RI activities in ORNL main plant area, continue characterization of inactive underground storage tanks and perform detailed design activities for inactive tank closures. Initiate sampling, plugging and abandonment activities for hydrofracture wells, and continue RI/FS for solid waste storage area (SWSA) six. Perform RCRA Facility Investigations (RFIs) at high priority waste area groups. (\$32,845)

Y-12 Plant - complete closure actions for four interim status LDUs, complete East Fork Poplar Creek and Bear Creek Burial Ground Environmental Impact Statements (EISs), and initiate corrective measures for East Fork Poplar Creek. Complete preparation of RFI plans for remaining solid waste management units (SWMUs), continue closure of treatment, storage and disposal (TSD) units, and continue implementation of high-priority remedial action plans. (\$47,900)

Feed Materials Production Center (FMPC) - complete site-wide RI/FS, initiate groundwater remediation, and begin conceptual design for insitu stabilization and for remediation of waste pits and silos. Conduct RI/FS activities in the FMPC main plant area and install additional off-site monitoring wells. Initiate engineering for underground storage tank remediation and bench scale studies in support of the risk assessment and

final RI. Continue studies and remedial actions in support of the Fields Brook National Priorities List (NPL) site. Continue investigation and studies at Reactive Metals, Inc. (RMI) and vicinity soils and groundwater, and initiate preliminary design for RMI cleanup measures. (\$23,000)

Oak Ridge Gaseous Diffusion Plant - conduct planned RFI in accordance with plans and schedule approved by the Environmental Protection Agency. (\$14,000)

Richland

\$ 80,223

Hanford site- continue RI/FS work on operable units initiated in prior years, and initiate RI/FS work plans for additional operable units for the 100 aggregate area. Provide equipment to stop liquid discharges to the 300 area process trenches so that RI/FS activities can be completed. Complete closure plan for the non-radioactive Dangerous Waste Landfill, and initiate partial closure of the A-29 Ditch. Continue single-shell tank (SST) waste characterization retrieval investigations, core sampling, and barrier performance development. Increase analytical laboratory capability and upgrade drilling capability to support RI/FS and SST characterization activities, provide support for the Pacific Northwest Hazardous Waste Research, Development and Demonstration Center, and perform assessment and inspection of newly discovered hazardous waste release sites.

San Francisco

\$ 11,563

Lawrence Livermore National Laboratory (LLNL) Main Site - complete RI/FS of groundwater contamination as required by the Federal Facility Agreement, and continue reclamation of contaminated groundwater at portions of the main site and offsite areas. Initiate activities to mitigate infiltration from storm water on the eastern half of the LLNL main site.

LLNL Site 300 - initiate selected remedial actions at inactive landfills, disposal lagoons, and underground tanks. Continue FS and remedial action engineering design activities.

Savannah River

\$ 56,168

Savannah River Plant - continue closures of MET Lab seepage basin, Mixed Waste Management Facility and Savannah River Laboratory seepage basins. Initiate closure of the F and H seepage basins and the New TNX basin. Continue M Area groundwater corrective actions, and RFIs at other inactive waste sites. Initiate decommissioning of Tank 16.

Other, All Sites

\$ 36,993

Provides continued technical support on program operations to include: program communication and documentation, technical and budgetary analysis of field activities, and ER task prioritization system. Provides for continued technical support to field offices, strategic planning, analysis of technical needs and regulatory requirements, technology transfers, regulatory information updates, and coordination of technology demonstration activities. Provides Defense Programs' share of remedial actions at Maxey Flats Disposal sites.

Total

\$401,293

QUESTIONS FROM CHAIRMAN GLENN

Priorities for Modernization and Cleanup

Question 3: The budget request includes over \$300 million for work on two New Production Reactors (NPR). In addition the budget requests funds for the Special Isotope Separation (SIS) facility in Idaho. Obviously, the high levels of funding necessary for these projects competes with funding for environment, safety and health activities. If we are faced with a \$100-200 billion price tag for cleanup in the next several decades, how will priorities be set between the need for facilities and the need to clean up the existing facilities?

Answer: The Department is very skeptical of cost estimates which have been generated to cover a 20-30 year period. Specifically, the cleanup figures have not been based on a realistic analysis of what needs to be done at each site. Once we have completed characterizing these sites, formulated a 5-year plan of action for our total program, and established a budget line to meet these goals, we will then have a better gauge on the environmental costs which must be balanced against national security interests in defense projects.

QUESTIONS FROM CHAIRMAN GLENN

Question 4: Will DOE enter into some formal agreement with the State of Ohio and other affected States to ensure that these sites will be cleaned up even after operations have ceased?

Answer: DOE has signed a Federal Facility Compliance Agreement (FFCA) with the U.S. Environmental Protection Agency, Region V.

The conditions defined in the FFCA will ensure cleanup of the FMPC even after operations have ceased. The State of Ohio was asked to be a party to the FFCA but declined to participate.

The Department's cleanup proposals, planned activities, and State or Federal level interagency agreements are not contingent on continued operational status of weapons complex sites. Also, the Department's guidance for provisions of future interagency agreements does not contain any language that would make the commitments of the Department contingent on continuation of operations at a facility requiring cleanup of environmental contamination.

QUESTIONS FROM CHAIRMAN GLENN

Question 5: It would seem to make good sense to employ the people who know the most about these plants in the job of cleaning them up. How does DOE plan to use the experienced local labor forces and minimize the economic impact of any plant shutdowns?

Answer: With respect to undertaking cleanup actions at its sites, the Department will employ an acquisition strategy that provides for: (1) maximizing competition; (2) promoting use of qualified industrial concerns; (3) providing for use of qualified minority and disadvantaged contractors; and (4) avoiding conflict of interest. To the extent that the current operating contractors at the Department's facilities meet these objectives, they would be given full consideration for undertaking cleanup actions at the sites. It stands to reason that whatever contractor is selected for cleanup activities would make use of the local labor force; particularly those with special knowledge of, and skills in dealing with, site contamination. Retraining of personnel will be considered where effective and where efficient utilization of experienced personnel would enhance the cleanup schedule or take advantage of previous experience and DOE operational database to identify potential sources of concern and previous methods of disposal. The application of highly skilled scientists or technicians is not felt to be an effective use of resources in cleanup activities.

QUESTIONS FROM CHAIRMAN GLENN

Question 6: What specific policies has the Department adopted with respect to the liability of contractors who do not make prompt notifications of such problems as in the two latest incidents at Savannah River? Are financial penalties among DOE's enforcement tools and if so, in which instances have they been applied?

Answer: I expect our management and operating (M&O) contractors to be accountable for their actions by complying with applicable standards, guidelines and regulations in the conduct of their operations. This accountability will be assured through Department of Energy (DOE) oversight of performance by the Headquarters and field activities, through issuance of directives, on-site inspection, and detailed appraisals. In order to assure that all DOE M&O contractors know we intend to hold them accountable for the performance of their management team assigned to the operation and management of DOE facilities and plants, we will be utilizing our policies governing contract renewals. For those contractors not meeting DOE requirements who show lack of good faith in contract execution, such as failure to notify DOE of problems, replacements will be considered.

In addition to encouraging good performance, the DOE is taking steps to strengthen its award fee evaluation process to take into

Answer 6
continued:

account situations in which performance and contractor actions are substandard. A cost-plus-award-fee contract provides a higher fee potential for a contractor by putting at risk a portion of the otherwise expected "normal fixed fee." An award fee plan is developed by the Department which specifies what level of performance is expected of the contractor, highlighting any areas that warrant special attention, such as compliance with environment, health, and safety rules and procedures; reporting of problems; communicating with the DOE; etc. In those cases where a contractor is evaluated as not performing up to the standard required by the contract, i.e., applicable standards, guidelines, regulations, and DOE orders, and shows an overall lack of good faith effort in contract execution, the contractor will receive a lesser amount of the available award fee or possibly no fee. Actions are underway to assure the DOE fee evaluation system for the 24 management and operating contracts within the weapons complex with cost-plus-award-fee provisions appropriately reflect the performance of the contractor in all areas.

QUESTIONS FROM CHAIRMAN GLENN

Question 7: What is the Department doing to implement the provisions in the Price-Anderson Act with respect to civil penalties levied on contractors for violation of DOE rules and regulations?

Answer: The Department is moving ahead to implement the civil and criminal penalty provisions of the Price-Anderson Amendments Act of 1988 as a major part of its overall safety program. The approach we are following is outlined below.

- o Request public input by Federal Register Notice of Inquiry (NOI).
- o Establish program objectives.
- o Perform reviews of other Federal agency enforcement programs.
- o Identify alternatives for implementing civil penalties.
- o Establish basic elements of program by end of CY 1989.
- o Prepare detailed program directives.

Currently, the Department is reviewing other Federal agency enforcement programs, identifying alternatives and preparing the Federal Register NOI. Concurrently, the Department is strengthening the definition of standards that will be the bases for citation of violations (DOE Orders, reactor Technical Specifications, nuclear facility Operational Safety Requirements, etc.).

QUESTIONS FROM CHAIRMAN GLENN

Question 8: What is the Department doing in terms of revising its system of awards for contractor environmental, safety and health performance?

Answer: Existing award fee plans for the Department of Energy's (DOE's) management and operating contractors are being reviewed and modified to enhance contractor accountability. Selected plans are being revised in the environmental, safety, and health, and other areas to:

- require the contractor to establish a self-assessment program to measure progress against required standards of excellence.
- evaluate the realism of the contractor's self-evaluation as part of the evaluation of the contractor's performance.
- provide the contractor with favorable ratings for identifying problems to DOE, and the development and implementation of corrective actions.
- appraise the contractor's diligence in developing written procedures for all aspects of the contractor's operation, and the degree of adherence to these procedures by the contractor's employees.

Answer 8

continued:

- clearly define in the plan that the contractor's failure to oversee the conduct of its operations and all of its employees, which potentially; or actually causes property damage, losses, endangers the safety, health or environment, or compromises the ability of the Department or the contractor to carry out its mission, will be weighed heavily in the performance ratings.
- indicate that the performance ratings will not be adversely affected if the contractor raises safety issues to DOE for resolution.
- indicate that performance ratings will not be adversely affected if the contractor stops an activity which is deemed unsafe, even though the contractor's action may appear to be contrary to DOE direction.

QUESTIONS FROM CHAIRMAN GLENN

Question 9: In the commercial nuclear world there is a requirement to notify the NRC of any abnormal occurrence during reactor operations. The NRC must, in turn describe such occurrences to Congress. What system does the Department have in place to provide a similar function for the weapons complex and what incidents has it reported?

Answer: The Department of Energy has in place three directives which incorporate requirements for notifying the Department of various abnormal occurrences at Departmental facilities (including nuclear reactors):

- a. Order DOE 5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements," 2-24-81. This order addresses the notification, investigation, and reporting of occurrences having environmental protection, safety, or health protection significance for Departmental operations. Among the requirements are 18 categories of occurrences requiring immediate notification by telephone to the Headquarters Emergency Operations Center (EOC), with a confirming teletype required as follow-up.
- b. Order DOE 5000.3, "Unusual Occurrence Reporting System," 11-7-84. This order provides criteria and instructions for reporting unusual occurrences that have programmatic significance (including safety

Answer 9
continued:

factors) at Departmental operations, analyzing the information reported, and disseminating the analysis results. It requires that "Field organizations shall promptly report to the appropriate PSO [Program Secretarial Officer] those unusual occurrences of major significance." Within 10 days of an immediate notification of an unusual occurrence, a written report describing the occurrence and corrective actions is to be transmitted to Headquarters.

- c. Notice DOE N 5480.4, "Preliminary Notification of Environment, Safety, and Health Concerns," 6-21-88. The objective of this notice is to require prompt notification to the Department of potential issues or concerns that could lead to serious events. The EOC must be notified within 4 hours of identification of an issue or concern having environmental protection, safety, or health protection significance. Seven categories of issues and concerns are defined in the notice.

Answer 9
continued:

DOE issues both quarterly and annual reports which summarize significant events and trends in safety and health performance throughout Departmental operations. The data for these reports are provided from a centralized collection system for accident and unusual occurrence reports. Last year, EH instituted the Daily Event Evaluation Program. Each weekday, a panel of EH technical experts reviews all notifications made to the EOC and all events reported to the centralized system since the last panel meeting. These daily reviews are intended to assure that appropriate corrective actions are being taken and to aid in identifying adverse trends and lessons to be shared. This new program is one of several steps which EH is taking to develop a viable event evaluation program.

QUESTIONS FROM CHAIRMAN GLENN

Question 10: Recently, DOE's office of Environment, Safety and Health issued an appraisal of the health physics program at the Savannah River Plant. The report finds a lack of effective management controls, the lack of management responsibility for contamination control in the workplace, the failure to maintain state-of-the-art practices and procedures and the lack of effective oversight by the DOE. What are the Departments plans to remedy these defects?

Answer: Specific plans to deal with the concerns and root causes identified in the Office of Environment, Safety and Health report are being developed by Savannah River (SR) at this time. DOE Order 5480.11, issued in December 1988, defined new radiation control program requirements which are intended to achieve comparability with the nuclear industry. Detailed implementation plans for SR will be provided in May 1989. On April 1, 1989, Westinghouse began management and operation of the SR site under a new award-fee contract that provides a mechanism for focusing contractor attention on needed improvements. The SR office is proceeding with plans to increase the number of DOE employees to oversee Westinghouse activities as well as obtaining independent contractor support to provide a strong oversight program. Management and control concerns will be a priority for SR and Westinghouse.

QUESTIONS FROM CHAIRMAN GLENN

Question 11: Does the contractor at the Savannah River Plant rely frequently on the use of construction workers to perform radioactive maintenance and repair? If so, does DOE have an effective way to keep track of their exposures and to keep their risks, as a group, as low as possible?

Answer: Yes, the contractor does rely on the use of qualified construction workers to conduct maintenance and repair activities in radiation areas. However, the Department does have an effective way to keep track of worker exposures and keep their risks as low as possible. Thermoluminescent and neutron dosimeters, as appropriate, are required to be worn by all employees working in radiation areas. Construction employees receive the necessary training prior to working in radiation areas and work is performed according to job plans or special procedures. These job plans or special procedures contain estimates of the individual and total personnel exposures for the job. Detailed stepwise instructions are written before a job is performed and must be approved by the Safety, Health Protection Supervision Branch, the Operations Custodian and the Construction Division Engineer. These instructions delineate all radiation protective requirements for the particular work to be performed. Expected doses are then compared with actual doses received to ensure that radiation standards are not exceeded.

DOE and contractor management are committed to keeping the radiation dose to construction employees as low as reasonably achievable and the Supervision Branch plans work involving radiation exposure such that personnel exposures are distributed as evenly as possible over the entire year.

QUESTIONS FROM CHAIRMAN GLENN

Epidemiology

Question 12: It is my understanding that the workforces at the Nevada Test Site and the Idaho National Engineering Laboratory are not subject to epidemiological studies. Instead, DOE is studying workers from these and other sites in its 5+ rem study. This does not appear to be an adequate substitute, mainly because there probably were circumstances, particularly with construction workers, where dosimetric data is tenuous at best. Given the fact that both the test site and INEL experienced very large environmental releases of radioactivity, studies of workers at these sites are conspicuous in their absence. Why has DOE chosen to not study the health and mortality experience of all workers at these two sites?

Answer: The goal of the Department of Energy (DOE) Health and Mortality Study, initiated in 1964, is to investigate the mortality experience of all present and former employees at sites operated under contract to the Department and its predecessor agencies. It is expected that eventually this comprehensive investigation, will include approximately 600,000 workers. This comprehensive investigation, which includes many sub-studies, is proceeding sequentially. That is, the study of workers who have been exposed to 5 rem or more in a year has been given very high priority, and thus is in progress now. Therefore, information on workers who have had exposures at this level has been requested from all DOE sites, including the Nevada Test Site and the Idaho National Engineering Laboratory. The Department will ultimately study all workers at these sites including those with lower than 5 rem exposure.

QUESTIONS FROM CHAIRMAN GLENN

Question 13: Does the Department use "as low as reasonably achievable" radiation protection standards at the plants and facilities within the weapons complex? Are such standards being met by all contractors?

Answer: The "as low as reasonably achievable" (ALARA) approach to radiation protection has historically been prescribed by DOE Orders, with strengthened program requirements provided in the recently revised DOE Order 5480.11 (Occupational Radiation Protection), promulgated in December 1988. However, reducing unnecessary radiation exposure in the workplace is as much a function of management commitment and critical self-assessments of operations, as it is of adequate standards and oversight. Attention to strong DOE line management of environment, safety and health is a high priority of Secretary Watkins.

Some DOE technical safety appraisals have found ineffective implementation of ALARA in certain sectors of the weapons complex. For instance, reviews of the radiation protection programs at Savannah River, Rocky Flats, and Y-12 plant, surfaced major deficiencies in contamination control, a key element of ALARA.

Answer 13
continued:

With the strengthening of DOE Order 5480.11 as a starting point, a concerted effort is underway to upgrade radiation protection programs at DOE nuclear facilities through stronger management controls, improved worker training, and improved implementation of accepted practices and procedures. This implementation program will serve to strengthen DOE-wide understanding of, and commitment to, the precepts of a sound ALARA approach.

QUESTIONS FROM CHAIRMAN GLENN

Question 14: In a January 13 letter to Secretary Herrington, John Ahearne, Chairman of the Advisory Committee on Nuclear Facility Safety indicates that "many steps must be taken and objectives met before any of the SRP reactors can be restarted. Yet there does not seem to be a coherent expression of the level of safety toward which all of these actions are directed." The SRP reactors have been shut down since August of last year. Subsequently a review of the reactors and the reactor operation has been undertaken. Have all the deficiencies now been identified?

Answer: Yes, all the deficiencies have been identified. We are now reviewing the issues to determine which ones will be resolved prior to restart and which ones can be resolved over the long term. A firm reactor restart recovery plan for K Reactor addressing the restart issues will be available by June 1989.

Question 15: * DOE developed a restart strategy to address the problems which have been identified and that strategy has been reviewed by DOE's Advisory Board on Nuclear Facility Safety. In general, how is the Department planning to address the board's comments regarding the restart strategy?

Answer: The resolution of these issues and those identified by the many oversight committees will be fully addressed in the Department's Savannah River restart strategy plan.

QUESTIONS FROM CHAIRMAN GLENN

Question 16: The Committee understands that seismic standards for reactors at Savannah River are now being addressed. Have standards been set, and how long will it take to make improvements needed to meet the new standards?

Answer: The seismic standards for the reactors at Savannah River have been set and implemented in the analyses of numerous plant features. These interim standards allow continued use of those original standards that are adequate and require evaluation against current industry standards where the original standards are not adequate for reactors at the Savannah River site.

The long-term seismic upgrade program currently under development will address remaining plant safety features, such as confinement and other mitigation systems, as well as replacement of the short-term systems. Plant modifications will be accomplished during scheduled shutdowns. The modifications will vary in type and extent with each of the three reactors, but will likely require on the order of several years to complete. Interim compensatory measures will be instituted in the short term.

QUESTIONS FROM CHAIRMAN GLENN

Question 17: At the joint hearings of September 30, William Kasper, DOE's Manager of the Savannah River Plant, indicated that a revised Safety Analysis Report on the 200-Area high-level waste tank farm operation was in the final stages of completion. What is the status of this report? Please provide the committee with the current version of this report.

Answer: This report, entitled Safety Analysis, 200 Area, Savannah River Plant, Separations Area Operations, Liquid-Radioactive Waste Handling Facilities, numbered DPSTSA 200-10, Supp 18, and dated August 1988, was approved by P. W. Kasper, Savannah River Plant Manager, in a letter to the contractor dated August 2, 1988. A copy of the document is provided.

This document includes a complete description of the waste tank farm facilities in both F and H Areas with all of the tanks, evaporators, control rooms, lines, pumps, diversion boxes, etc. It also lists the many safety features and describes the environmental monitoring that is in place to detect any releases to the air, soil, or groundwater. This document is formally updated every 5 years to include any changes to the facilities, or any new facilities added in the interim. The same rigorous safety and environmental evaluation is performed for any new facility.

QUESTIONS FROM CHAIRMAN GLENN

Question 18: Is the Department conducting or has it conducted safety analysis studies of the high-level nuclear waste operations at Hanford and INEL? Please provide such studies if they have been done (or, if not, provide an explanation why they have not been done).

Answer: The Department conducts safety analyses that cover all high-level nuclear waste operations at both the INEL and the Hanford reservation. Detailed Safety Analysis Reports for current operations at both the INEL and the Hanford site are provided.

Assessments of safety and environmental impacts for high-level nuclear waste operations at Hanford have also been performed by the National Research Council of the National Academies of Science and Engineering with a report, Radioactive Wastes at the Hanford Reservation: A Technical Review, issued in 1978. This report concluded that there has not been in the past any significant radiation hazard to public health and safety from waste management operations at Hanford. In addition, safety analyses have been performed for each HLW operation and for every subsequent significant modification; safety analyses are updated as changes in operations or regulations dictate.

QUESTIONS FROM CHAIRMAN GLENN

Question 19: The K reactor has been the focus of the Department's restart efforts. DOE has recognized the need for more specific technical operating standards for its reactors, and has been formulating these standards for some time now. Are these now complete and available or will the K reactor be restarted before they are complete?

Answer: The Department is currently revising their technical specifications for reactor operations at SR. Those key technical specifications identified as being essential to restart of K Reactor will be completed prior to restart. In addition, a linking document which bridges the gap between these technical specifications and operating procedures, and specific training of operators within this envelope, as well as a safety analysis report, will comprise an operating direction for safe operation of K Reactor.

QUESTIONS FROM SENATOR GLENN

Acceptable Funding Level

Question 20: Secretary Herrington has stated that current funding levels at DOE during this fiscal year are unlikely to be sufficient to assure that reactor operations are "...within the bounds of acceptable risk." What would be an acceptable funding level, and given the time frame involved, would increased funding enable safe restart this year?

Answer: The comments from the former Secretary of Energy deal with internal discussions between the Department and the Reagan Administration in developing the FY 1990 budget addressing budget shortfalls for FY 1989. The FY 1990 Bush budget request provides adequate funding for these activities. The Department forwarded a reprogramming action for fiscal year 1989 to the Congress on February 16, 1989, which if approved, will provide the required funding to support safe restart of the Savannah River reactors as well as to make other high priority waste management improvements.

QUESTIONS FROM CHAIRMAN GLENN

Question 21: What options are available to us to ensure the continued supply of tritium? Are there stockpiles of unused or unnecessary weapons from which we could mine tritium for use in active weaponry? Please provide a classified and unclassified response to this question.

Answer: Without new tritium production there is only one option for meeting the Nation's tritium demand. This is through utilization of the existing inventories of tritium. These inventories exist in Department of Defense (DOD) stockpiled weapons and in the Department of Energy (DOE) inventories used to support the stockpile. About 5.5 percent of this total inventory decays away each year. In the absence of new production, DOE will draw down its inventories to minimum working levels to replace decay losses in the stockpile and to meet the other demands such as testing and research and development. Obviously, at some point the DOE working inventories could reach a level which can no longer support the currently scheduled stockpile force structure without additional tritium being made available.

As to the ability to "mine tritium" from other sources, the President ordered a complete inventory review of the tritium in the U.S. owned by DOE and DOD. We will report to the President in July and let him know what flexibilities we have.

Finally, in addition to restarting the Savannah River reactors, DOE is studying alternate tritium production contingencies. However, our first priority and primary activities are dedicated to achieving the maximum assurance that the Savannah River reactors can be restarted and operated safely until new production capacity is constructed and operating.

QUESTION FROM CHAIRMAN GLENN

Question 22: How were longer-term strategic considerations taken into account when devising the 2010 report? For example, how did you consider the impact of a potential START agreement as well as other possible arms control agreements down the road?

Answer: The modernization study considered treaties in force and treaties that were expected to be in force, such as the Threshold Test Ban Treaty and the INF Treaty at the time, but did not consider potential future treaties. It was the belief that such consideration would limit the prerogatives of both the Executive Branch and Legislative Branch of government. As further information becomes available on potential future treaties, their impact will be factored into modernization planning.

QUESTIONS FROM CHAIRMAN GLENN

Question 24a:

How does the Department currently keep track of worker exposure at each plant?

Answer:

Information on worker exposure (dose) is kept by the Department's operating contractors in individual files. The files are maintained at the facility where the worker is employed. The following records are required by DOE Order 5480.11, "Radiation Protection for Occupational Workers":

Internal Exposure:

1. Annual effective dose equivalent received from radioactive material deposited in the body;
2. Annual dose equivalent to organ or tissue of concern received from radioactive material deposited in the body;
3. Committed effective dose equivalent from intakes occurring during the year;
4. Committed dose equivalent to organ or tissue of concern from intakes occurring during the year.

External Exposure:

1. Annual effective dose equivalent from external sources of radiation.
2. Annual dose equivalent to the lens of the eye.

Answer 24a
continued:

3. Annual dose equivalent to the skin.
4. Annual dose equivalent to the extremities received during the year, including: (1) hands and forearm below the elbow and (2) feet and legs below the knee.

Summation of Internal and External Dose Equivalent:

1. Summation of the annual effective dose equivalents received from external and internal sources during the year.
2. Cumulative annual effective dose equivalent received from external and internal sources while employed at a facility.

In addition, DOE Order 5484.1 ,
"Environmental Protection, Safety and Health
Protection Information Reporting
Requirements" requires annual reports on
radiation exposure to be submitted by
operating contractors to the Department'
records center.

QUESTIONS FROM CHAIRMAN GLENN

Question 24b: What kind of surveillance system does the Department use to monitor the environment and the health of nearby communities, regarding both unusual occurrence releases and chronic exposures?

Answer: General requirements for environmental surveillance programs at DOE facilities are specified in DOE Order 5400.1, "General Environmental Protection Program" and include specific applicable Federal, State, or local regulations, in addition to those required by DOE. Because each DOE facility is unique, the magnitude of a site's monitoring program is determined by the appropriate Field Office on a case-by-case basis, consistent with regulatory requirements, DOE directives, and the degree of environmental assurance that activities at the particular site require.

Routine environmental surveillance includes sampling of air, water, vegetation, meat, milk, and other foodstuffs and biota in the vicinity of the site. Special studies are undertaken from time to time and have included radiation

Answer 24b continued:

measurements to members of the general public.

Environmental surveillance programs are designed to provide information from both routine (i.e., chronic) and accidental or unplanned (i.e., unusual occurrence) releases. Additional sampling may occur in the event of an accidental release, depending on the severity of the event. Specific guidance on sampling during accidents is contained in DOE Orders, the most current being draft Order 5500.3A.

Epidemiological (i.e., "health") studies are not routinely conducted at DOE facilities. The recent and earlier special studies by independent agencies such as the Centers for Disease Control in the National Institutes of Health have concluded that there is no discernable effect on public health from operations at several DOE facilities. With oversight by independent groups, DOE continues to reconstruct radiation doses to communities from historical releases at those DOE facilities.

QUESTIONS FROM CHAIRMAN GLENN

Question 25: What is the status of DOE's efforts to characterize the radiological and toxic contamination of all of its sites?

Answer: The Department of Energy (DOE) is actively characterizing the extent of contamination at many of its facilities in accordance with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and/or the Resource Conservation and Recovery Act, as amended (RCRA). On January 6, 1989, DOE submitted to Congress its annual report required under CERCLA, as amended, section 120 summarizing progress and activities to date to characterize, evaluate and remediate contamination at its facilities.

DOE submitted preliminary assessments (PAs) to the Environmental Protection Agency (EPA) in April 1988, for the DOE facilities listed on the Federal Agency Hazardous Waste Compliance Docket. The PAs provide information regarding contamination needed for EPA to determine whether a facility should be listed on the CERCLA National Priorities List (NPL). Currently five DOE facilities are listed on the NPL, two are proposed for listing on the NPL and

Answer 25
continued:

approximately nine facilities are expected to be proposed for listing on the NPL when EPA issues its proposed NPL listing of Federal facilities.

At nine facilities, DOE has negotiated agreements, consent orders or corrective action permits under CERCLA/SARA or RCRA with the EPA and/or states to provide the framework and schedules for remedial activities. Negotiations to revise several of these agreements or permits have been initiated, and negotiations for clean up under CERCLA and/or RCRA have begun at several other DOE facilities.

QUESTIONS FROM CHAIRMAN GLENN

Question 26: What is the status of DOE's efforts to decommission and decontaminate all defunct and currently operating nuclear facilities?

Answer: The Defense Decontamination and Decommissioning (D & D) Program is responsible for inactive contaminated facilities at DOE defense sites. A survey of inactive facilities at all DOE defense sites was recently completed which identified an additional 180 facilities for inclusion in the Defense D & D Program, bringing the total to about 400. Plans and schedules for decommissioning these facilities are being updated and revised.

Within the Office of Nuclear Energy, the Surplus Facilities Management Program is carrying out the decontamination and decommissioning of defunct facilities and is projecting to complete the current inventory of Nuclear Energy facilities by 2015. The Department is beginning work on a 5-year plan which will include defunct facilities in the Office of Nuclear Energy. With respect to the currently operating nuclear facilities, they will be decommissioned at the end of their useful lifetimes, which cannot be estimated at this time.

The decommissioning of operating facilities is the responsibility of the operating program office. Planning for facility decommissioning is conducted as part of facility operations and is initiated in advance of permanent shutdown of a facility.

QUESTIONS FROM CHAIRMAN GLENN

Question 27: Both the Modernization and December reports contain some large cost estimates for the decontamination and decommissioning of production reactors and facilities. Even though the Department has continually indicated that these are not budget quality numbers, there must be some basis for the Department's numbers. What specific method or model did the Department use to arrive at these estimates?

Answer: For the Modernization Report, all contaminated inactive facilities as well as facilities planned to be inactive by 1995 in the Nuclear Weapons Complex were identified and a range of cost estimates were developed based on possible D&D alternatives, i.e., protective storage, entombment and "greenfield." Criteria for each D&D alternative were developed for use in estimating costs, and estimates developed by each facility were reviewed by a group of D&D experts for consistency. A strategy and a funding profile were developed to address both cleanup of environmental contamination and D&D of inactive facilities for the Modernization Report. Criteria developed for the Modernization Report were used in estimating the D&D needs for the DOE-wide December Report which included all major DOE facilities and programs.

Separately, D&D estimates were also developed for the proposed "shut-down" cases as a part of the Modernization Report.

QUESTIONS FROM CHAIRMAN GLENN

Question 28: Is the Department's Defense Waste Management Plan on schedule? What steps are being taken by the Department to assure that this plan is in compliance with RCRA/CERCLA and other applicable environmental laws?

Answer: The Defense Waste Management Plan (DWMP), DOE/DP-0015, was prepared in June 1983 in response to Public Law 97-90 in which the U.S. Congress requested that the executive branch prepare a report setting forth the plans for the permanent disposal of high-level (HLW) and transuranic (TRU) wastes resulting from atomic energy defense activities. The plan presented a sequential approach for the long-term management and disposal of HLW and TRU waste at each site. The DWMP recognized that the costs and schedules presented would be reviewed annually by the Department. New activities described in the plan would be reevaluated in terms of their scope, timing, need, and relative ranking compared to other Department priorities. New environmental laws and changes in program emphasis have resulted in some schedule delays in implementation of the plan. Progress in implementing the DWMP is updated annually by the DOE Office of Defense Waste and Transportation Management and is reflected in the Program Implementation Plan (PIP). The latest version of the PIP, DOE/DP-0059, is attached. To provide current understanding of the costs to achieve compliance and accomplish

Answer 28 continued:

environmental restoration and to assure that state-of-the-art practices are being employed, a new 5-Year Plan is being developed. This Plan will be available in August, for the FY 1990-1995 planning period.

The Department issued its Byproduct (mixed waste) rule in May 1987; this rule recognized that all DOE radioactive waste which has hazardous constituents is subject to regulation under both RCRA and the Atomic Energy Act. All DOE waste operations facilities which actively treat, store, or dispose of mixed waste are required to comply with RCRA and other applicable environmental laws. Remediation of inactive waste sites and facilities is being conducted in accordance with CERCLA, as amended, and RCRA corrective actions requirements. The Department is actively pursuing a program to comply with the requirements of CERCLA, as amended, including development of Departmental Orders, and aggressive pursuit of interagency agreements for cleanup and submittal of preliminary assessments required by EPA for those DOE facilities listed on the Federal Agency Hazardous Waste Compliance Docket. A copy of the U.S. Department of Energy Annual Report to Congress for Fiscal Year 1988 Comprehensive Environmental Response, Compensation, and Liability Act, as Amended by the Superfund Amendments and Reauthorization Act Section 120(e)(5) is provided.

QUESTIONS FROM CHAIRMAN GLENN

Question 29: What studies does the Department have to determine how long grouted radioactive and hazardous wastes will hold up?

Answer: Grouted wastes are being disposed of onsite at Savannah River in Aiken, South Carolina, and at the Hanford site in Richland, Washington. Extensive mathematical modeling and field lysimeter tests have been performed at both sites to characterize the long-term affect on the environment. At Savannah River these tests were performed as part of the permitting process with the State of South Carolina.

Additionally, an important requirement of the grouted waste is its ability to maintain integrity over the long-term to prevent disruption of the protective barriers surrounding the waste form. Grout durability studies at Hanford will be completed, prior to hazardous waste processing, to evaluate the long-term potential for volumetric changes. Compressive strength tests and microstructure analysis will be performed to provide additional information on long-term performance.

QUESTIONS FROM CHAIRMAN GLENN

Question 30: What studies does the Department have to determine if glassified high-level military nuclear wastes are compatible with the geological medium at the Yucca Mountain site? Please provide these studies.

Answer: The Office of Civilian Radioactive Waste Management is responsible for developing specifications for defense high-level waste (DHLW). These specifications are developed to ensure that the waste package design, including the defense high-level waste form, meets the NRC and EPA guidelines for disposal in a licensed repository. The specifications address various requirements, such as control of radionuclide release properties, chemical and phase stability, combustibility, organic content, gas pressure, canister materials and canister closure, etc.

Numerous studies have been conducted using both radioactive and nonradioactive waste samples. Some of these tests used actual Tuff rock and J-13 well water from the Yucca Mountain site. Other tests have been performed on borosilicate glass to demonstrate the long-term leachate performance. Leachate results from these tests have been used in various models to project release rates in the repository under saturated conditions. An experimental program is also being developed to study the reaction of borosilicate glass under conditions that may exist in an unsaturated repository.

The results of these studies are being developed into a waste qualification report which will be completed over the next two years.

QUESTIONS FROM CHAIRMAN GLENN

Question 31: In terms of the Department's efforts to store high-level military nuclear waste at the Yucca Mountain site, what specific program does the Department have in place to pay for its share of the cost of long-term disposal? How much will the Department have to pay to store high-level waste at the Yucca Mountain site?

Answer: Section 302 of the Nuclear Waste Policy Act (NWPA) requires the Department to pay a "fair-share" fee for the disposal of DHLW once the President determined a defense-only repository was not needed. Starting in 1985, the Offices of Defense Programs and Civilian Radioactive Waste Management (RW) worked together to develop a cost allocation method to determine the DHLW cost share. The final method was published in the Federal Register on August 20, 1987. Reviews of the published method by the Office of the Inspector General and the General Accounting Office found the allocation method to be appropriate.

In the published method, the DHLW disposal cost includes all direct costs and shares of common costs. Sharing is based principally on the relative number of canisters and repository volume used. The average per-canister share in the published method is \$350,000/can, resulting in a total of \$6.2 billion for the current reference quantity of 17,750 canisters.

The Department has evaluated several payment options that could be used to pay its share of disposal costs. Near-term payments could range from \$50 million/yr. to \$300 million/yr., depending on the payment option selected.

QUESTIONS FROM CHAIRMAN GLENN

Question 32: What is the DOE's specific policy that will enable the production and utilization facilities in the weapons program to reach compliance agreements with states and EPA with respect to RCRA, Superfund and other environmental statutes?

Answer: Secretary Watkins has established a plan of action to accord environmental compliance and clean-up activities high priority within the Department of Energy. First, responsibility has been centralized for defense waste programs and coordination of all Departmental waste management, environmental response and clean-up activities. Secondly, an integrated Five Year Clean-up Plan is under development to characterize and prioritize all clean-up, waste management, and compliance activities at DOE sites. The Five Year plan is expected to be in place in August 1989, and will be comprised of individual site plans.

The Secretary has committed to work with EPA, the states, and Indian Nations to ensure that their concerns are addressed in the Five Year Plan and that the Plan's priorities are viewed as fair, effective, and timely. Once the Plan is in place, the prioritized clean-up and compliance activities will provide a sound technical basis for compliance agreements and other regulatory commitments such as permit schedules.

QUESTIONS FROM CHAIRMAN GLENN

Question 33: What provisions do these compliance agreements make requiring DOE to notify EPA and the States of events causing abnormal releases or contamination of the environment?

Answer: The statutory requirement for DOE to notify EPA of events causing abnormal releases or contamination of the environment is in section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). EPA has published regulations which clarify these reporting requirements. In addition, many States have requirements to report environmental releases. Consequently, the compliance agreements do not specifically include a requirement for reporting environmental releases. DOE routinely reports abnormal releases or contamination to both EPA and State regulatory officials.

QUESTIONS FROM CHAIRMAN GLENN

Question 34: Federal facilities were directed by OMB Circular A-106 to develop pollution abatement plans, including estimated project costs and milestones, and submit them to EPA for review. Why didn't this system detect the problems at the weapons plants and why wasn't it used to prioritize their cleanup?

Answer: The primary function of the A-106 planning process is to assure that funding requirements are identified for individual projects (corrective actions or cleanups) to provide an information base useful for supporting the annual budget formulation process. It is not the purpose of the A-106 planning process to detect problems nor does it have the inherent capability to do so. Detection is a function of ongoing monitoring and surveillance activity, inspections by DOE and other regulatory authorities, and by the Environmental Survey (later Audit) effort initiated in FY 1985. The A-106 planning process can only assist in the determination of the action to be taken, once a problem has been identified.

While the A-106 planning process has criteria for assigning a general priority (high, low or medium)

Answer 34
continued:

to corrective actions or cleanups, highly sophisticated models are needed to rigorously determine the relative priority rank of each action.

QUESTIONS FROM CHAIRMAN GLENN

Question 35: The A106 reports made available to the Committee list at least thirteen major projects out of compliance with Federal statutes at the Savannah River Plant complex alone. Some progress is being made at various facilities. Why haven't compliance agreements been reached at SRP?

Answer: Since 1979, SRP has entered into more than 20 compliance or settlement agreements with either EPA or the State of South Carolina to address compliance related issues. In addition, SRP is in the process of negotiating an interagency agreement with the EPA and the State of South Carolina under the Comprehensive Environmental Response, Compensation, and Liability Act which will address the investigation and cleanup of inactive waste sites on the complex. SRP is also currently addressing other compliance problems through settlement agreement negotiations with the State.

QUESTIONS FROM CHAIRMAN GLENN

Question 36: In 1977, the Congress authorized construction of the Waste Isolation Pilot Plant (WIPP) to store transuranic and low-level radioactive wastes. More than 10 years and several hundred million dollars later, it appears that DOE has failed to adequately address important technical and institutional issues which have created major delays in the startup of WIPP and a dangerous bottleneck of wastes piling up at DOE sites. What are the reasons for the delay in opening the WIPP facility?

Answer: The October 1988 opening planned for WIPP was delayed for several reasons. One issue that delayed the opening of WIPP was balancing the underground ventilation system at full-design flow. As a result of preliminary attempts to balance this system, it was found that full flow capacity through the air intake shaft (AIS) would be required and modifications to both surface and underground hardware were necessary.

Modifications to the TRUPACT-II shipping packaging have been revised as a result of the certification testing.

Beyond these technical difficulties, more time and effort was required to complete the institutional requirements than planned. DOE made the internal preoperational safety reviews more rigorous than necessary for the level of operational risk, in recognition of the vanguard role of the WIPP facility. Also, DOE concluded that the purposes of the National Environmental Policy Act would be best served by obtaining additional public comment and participation prior to initiation of waste activities. As a result, the DOE announced on December 6, 1988,

its intent to prepare a Supplemental Environmental Impact Statement for the WIPP facility. The development of the Performance Assessment Plan, the plan that will govern those activities to be conducted at WIPP during the five year test program has taken longer to develop than originally planned.

These steps have all contributed to the delay, but they are all steps that will lead to higher confidence when WIPP is opened.

QUESTIONS FROM CHAIRMAN GLENN

Question 37: Why did DOE recommend to the Department of Interior (DOI) last week that DOI should initiate an administrative land withdrawal for the land at WIPP? Does this action mean that the DOE approves of opening WIPP prior to a legislative withdrawal?

Answer: DOE prefers a legislative land withdrawal. It is the best solution because it effects a permanent transfer of land and custodial responsibility, and DOE will work with the Congress to achieve it as soon as possible. However, DOE is responsible for carrying out the congressional mandate in P.L. 96-164. To meet that responsibility it is prudent to have an alternative course of action. Therefore, the Department is also pursuing an administrative land withdrawal. The administrative land withdrawal will not be put into effect until January 1990, thus allowing the full first session of the 101st Congress for legislative action.

QUESTIONS FROM CHAIRMAN GLENN

Question 38: Will such a withdrawal provide adequate environment, safety and health protections similar to those included in legislation introduced by Senators Bingaman and Domenici?

Answer: In its request to the Department of Interior for a modification of the current administrative land withdrawal order, the Department requested that the modification not be made effective until DOE notifies the Department of Interior that all the actions necessary to demonstrate compliance with applicable safety and environmental requirements prior to facility operation have been completed.

QUESTIONS FROM CHAIRMAN GLENN

Question 39: In terms of the Department's efforts to mix radioactive and hazardous wastes with cement for permanent onsite disposal, what steps are being taken to remove solvents and long-lived radionuclides such as I-129, Cs-135, Tc-99, and Pu-239 to assure that these dangerous substances will not leach out of the cement long after the waste form breaks down?

Answer: The Department is disposing of waste in the form of grout at the Hanford site and at the Savannah River site. The estimated concentrations of I-129 and Tc-99 in the grout at Hanford are comparable to Class A (10 CFR 61) limits for waste suitable for near-surface disposal. A table of the Savannah River saltstone performance is attached. There are no solvents that are of regulatory concern in Savannah River saltstone. At Hanford, studies have been conducted to demonstrate that RCRA hazardous constituents remain tied up within the grouted matrix and meet regulatory guidelines.

At the Hanford site, transuranic chemicals (including Pu-239) will be removed by solvent extraction for TRU element removal prior to grouting. The Savannah River process involves an in-tank precipitation step where cesium is precipitated out using sodium tetraphenyl-borate and the soluble strontium and residual plutonium is adsorbed by a slurry of sodium titanate. The salt solution is then decontaminated by filtration. Residual benzene, from radiolytic degradation of the sodium tetraphenyl-borate, is also removed following the in-tank process using stripper columns.

The Hanford Grout Disposal Program Performance Assessment projects that the disposal system complies with regulatory requirements for long-term protection of the environment. At Savannah River, extensive mathematical modeling and field lysimeter tests were performed as part of the permitting process with the State of South Carolina. The slag in the saltstone formulation reduces any technetium to an insoluble state, thus greatly reducing any groundwater impacts. Saltstone radionuclide concentrations are significantly lower than NRC Class A limits.

SALTSTONE PERFORMANCE

<u>RADIONUCLIDE</u>	<u>CONCENTRATION IN SALTSTONE *</u>	<u>PREDICTED PEAK GRNDWTR CONTENT **</u>	<u>EPA DRINK WATER STD., PROPOSED ***</u>
Sr-90	0.4 nCi/g	6.0×10^{-3} pCi/L	50. pCi/L
Tc-99	32.	90.	5,000.
Ru-106	16.	1.0×10^6	300.
I-129	0.018	1.0	100.
Cs-137	10.	0.2	100.

*Based on 55 wt% salt solution in slag saltstone

**1300 years after decommissioning (short-lived radionuclides peak sooner)

***Proposed maximum contaminant levels, Federal Register, Vol. 51, No. 189, p. 34836 (9/30/86)

(Ref: Letter, Wright to Ruiter (SCDHEC), 3/25/88)

QUESTIONS FROM SENATOR GLENN

Question 40: What is the Department doing with respect to sites where it may be impossible to fully clean up? Has the Department identified sites where this is the case? What plans does the Department have for long-term maintenance and surveillance of these sites and what are the projected costs?

Answer: The Department is approaching the waste cleanup task by first characterizing and assessing the extent of contamination and potential risk at each facility. Although the characterization and assessment process has not yet been completed, the Department knows of no sites at the present time which technically cannot be cleaned up, given sufficient time and resources. The highest priorities are being assigned where the highest risks to the public health and environment are found. High priority contaminated sites are being addressed now. It is anticipated that overall priorities will be reassessed in the FY 1991 budget formulation process.

To address the cleanup problem, Mr. Leo Duffy has been appointed as Special Assistant for Coordination of Department of Energy (DOE) Waste Management with responsibility for coordination, prioritization, and planning for all waste activities. Under Mr. Duffy, the Department has initiated the preparation of an integrated 5-Year Cleanup Plan. This plan will encompass three specific areas: waste management operations, inactive waste site cleanup, and corrective actions needed at all DOE operating facilities to bring air, water, and solid waste discharges within acceptable limits. This plan

Question 40 continued:

will coordinate and consolidate all Department waste and cleanup activities and provide a focus for the Department's management approach in this area. This plan will be used to reaffirm fiscal year 1990 programs and provide a basis for fiscal year 1991 programs and budget requests. In addition, the plan will assess current technology development activities and provide a basis for future research, development, and demonstration of new and innovative technologies. A final draft of this 5-year plan is scheduled to be available in August 1989.

U.S. Senator

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FOR IMMEDIATE RELEASE
January 26, 1989

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TESTIMONY OF SENATOR BROCK ADAMS

BEFORE THE SENATE GOVERNMENTAL AFFAIRS COMMITTEE

OVERSIGHT OF CLEANUP AND MODERNIZATION PROPOSALS FOR DOE WEAPONS PRODUCTION COMPLEX

Thank you, Mr. Chairman, and members of the Committee for the opportunity to testify this morning. I want to commend you, Senator Glenn, for your foresight, your diligence, and your commitment to this issue. Thanks to your leadership we have, for the first time, estimates of how much it will cost to address the environmental, safety and health problems at DOE facilities. As the General Accounting Office has pointed out, these estimates must be treated as preliminary, but we do have them and they can provide a starting point for congressional action. Thanks to your leadership we have, for the first time, a DOE modernization plan - the so-called "2010 Report" - that discusses the future of the weapons complex. The report, in my view, fails to make the hard choices that must be made on modernization of production facilities in a very tight budget situation, but at least we have a starting point for the debate. Thanks to your leadership this committee and the General Accounting Office have developed an oversight capability over DOE that has long been lacking and I believe the public record should show how much you have done.

I would also like to submit for the record the testimony of Governor Booth Gardner. On behalf of Governor Gardner and the citizens of the State of Washington, I thank you for inviting the Governor to appear at today's hearing. The Governor is unable to be here this morning because of obligations in the state and has asked me to convey his appreciation for the opportunity to address a matter that has been so important and controversial in our state: the operation of DOE's nuclear facilities. I am also pleased to be accompanied this morning by Christine Gregoire, the Director of the Washington Department of Ecology.

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Mr. Chairman, DOE's Office of Environment, Safety and Health projects the costs to meet environmental, safety, and health needs could exceed \$128 billion. This is more than the \$108 billion in federal and state funds spent to construct the interstate highway system. As Governor Gardner points out in his statement, almost half of this amount is attributable to Hanford; a site that has far more waste than any other DOE facility. Over 90% of these projected costs are attributable to defense facilities and over 98% of the costs are attributable to nuclear facilities.

Mr. Chairman, we get used to talking about large amounts of money in the Congress, but this task is truly an enormous undertaking and comes at a time when DOE is projecting a need for tens of billions of dollars in modernization costs. At current funding rates of just over \$1.1 billion a year, it would take 70 to 100 years to clean-up DOE's defense sites. It is my experience that when we are dealing with large, long-term, multi-billion dollar federal projects--which is what we face in cleaning up DOE's nuclear sites--we need to have a dedicated financing mechanism.

I will shortly reintroduce a proposal that I made last year to create just such a dedicated trust fund. Under my proposal Federal and commercial nuclear programs would pay their respective shares of the clean-up, decommissioning, and long-term surveillance costs of all DOE nuclear facilities. Under my proposal funding for the trust fund would come from:

- 1) DOE defense program budget;
- 2) DOE nuclear energy and research budgets;
- 3) commercial users of DOE services such as uranium enrichment services and nuclear isotope sales; and
- 4) federal agencies, such as the Navy, that use DOE nuclear facilities or services.

It would also come from fines, fees, and penalties assessed against DOE and its contractors for violations of federal environmental laws, as well as interest earned on trust fund receipts.

As Governor Gardner states, this is a national problem, brought about by the national government, and it requires a dedicated national solution. Those of us with DOE sites, such as Hanford, face a complicated series of problems including economic problems from the closure of facilities, changing Department of Energy funding priorities, changes in national energy policies.

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Governor Gardner and I have tried to begin to address these many needs by promoting economic diversification and new missions for Hanford, but that brighter future will not come to pass unless the Federal Government lives up to its obligations to clean-up and decommission its facilities and sites. I look forward to working with you and my other colleagues to make sure that this becomes a reality.

I would now like to introduce Ms. Christine Gregoire, Director of the Washington State Department of Ecology.

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STATEMENT OF
CHRISTINE O. GREGOIRE,
DIRECTOR,
WASHINGTON STATE DEPARTMENT OF ECOLOGY,
BEFORE THE
COMMITTEE ON GOVERNMENTAL AFFAIRS
UNITED STATES SENATE
JANUARY 26, 1989

Good morning Mr. Chairman. I am Christine Gregoire, Director of the Washington State Department of Ecology. I have worked intensively both in my role as the Director of the Department of Ecology, and in my previous position with the Washington State Attorney General's Office, on the problem of Federal Facility compliance with state environmental laws. I am grateful for the opportunity to testify regarding this issue and relate the difficulty the state of Washington has had in dealing with Federal Facilities.

In beginning, I would like to outline key events which have brought us together today.

DESCRIPTION AND HISTORY OF U.S. DOE AND HANFORD
SITE COMPLIANCE ISSUES

- o The Hanford reservation began as the U.S.A.'s first plutonium production facility in 1942.

- o The production of special nuclear materials is waste intensive, i.e., very large volumes of extremely hazardous and radioactive and so-called "mixed waste" is produced.

- o DOE's waste management and disposal practices changed little over the years. Antiquated practices focused on untreated wastes dumped into unlined pits or directly into soil.

o Radioactive mixed wastes were placed into temporary storage in 149 single-shell steel tanks (SSTs). They were constructed without groundwater monitoring systems and with no leak detection systems.

o As of today, 66 of Hanford's 149 SSTs are confirmed leakers. The remainder are failing as well. DOE (Energy) admits that over 500,000 gallons of tank waste have already leaked to the environment. Hanford contractors have reported that this waste will eventually contaminate area groundwaters. DOE has yet to install a groundwater monitoring system to determine if it already has.

o The Hanford reservation covers some 560 square miles of which approximately 230 square miles are already contaminated (source-EPA's NPL nomination package).

o Fifty-nine hazardous waste treatment, storage or disposal facilities (ISDs) are on the site. These are subject to permitting and cleanup requirements under state and federal hazardous waste laws. Some of these facilities are among the largest in the country - examples include Hanford's single and double shell tank farms, hazardous waste landfills and planned grout and vitrification plants.

o Fourteen hundred historical hazardous waste disposal sites have been identified on the site. These sites must be addressed under CERCLA or state hazardous waste cleanup laws.

SUMMARY OF THE STATE'S ATTEMPTS TO REGULATE HANFORD FACILITY

o 1942-1983, the Atomic Energy Commission, and later DOE, operated the facility with no regulation or supervision from the state or EPA. In effect, the facility was self-regulated.

o 1976-84, Energy took the position that RCRA and state hazardous waste laws did not apply to Energy facilities.

o In fact, in 1984 DOE refused to even allow state regulators on the site. Only after a Notice of Intent to Sue was filed did Energy allow access.

o In February of 1984, LEAF v. DOE was decided. In this case, the Federal District Court for Tennessee ruled that RCRA does indeed apply to DOE facilities.

o Following this key decision, DOE immediately took the position that RCRA and state hazardous waste laws applied only to hazardous waste which contained no "by-product" material. Thus, under this concept virtually all of DOE "mixed-waste" would have been exempted from RCRA. At Hanford, this would have left the state, and EPA, with little to no regulatory role.

o DOE took this position, for nearly three years, from 1984-1987. Finally, on May 1, 1987 Energy reluctantly recognized that RCRA applies to mixed waste. The Congress and many members of this Committee were instrumental in

forcing Energy to recognize RCRA jurisdiction over mixed waste.

This overview of the Hanford site and the state's largely unsuccessful attempts to regulate the facility brings us to 1988. Unfortunately, after recognition of RCRA's applicability to mixed waste, Energy's focus simply shifted from applicability to enforceability.

I will give you two examples of Energy's concern with the state's ability to enforce state laws at the Hanford facility. First, in February 1986, the Department of Ecology issued a \$49,000 civil penalty against Energy for several serious violations of RCRA. Energy challenged this penalty in federal court, arguing that the doctrine of sovereign immunity disallowed the state's imposition of the penalty. The state argued that the waiver of sovereign immunity in § 6001 of RCRA allows the state to issue and collect such penalties. The court eventually, and reluctantly I might add, agreed with Energy. We have appealed that decision and the case is pending before the Ninth Circuit Court of Appeals.

My second example begins almost one year ago. At that time, the state began negotiations with Energy and EPA regarding an agreement addressing RCRA compliance and CERCLA cleanup at the Hanford site. From the beginning of these

negotiations, the state's highest priority has been a truly enforceable agreement. In other words, the state must have the clear authority to force the Department of Energy, through judicial enforcement, to do those things it has promised to do. DOE has consistently resisted the state's efforts in this regard.

The state's best hope of avoiding the sovereign immunity defense, and all other jurisdictional defense, is for the Hanford agreement to take the form of a judicially enforceable Consent Decree. We have consistently been pressing for a Consent Decree in the negotiations. DOE, in consultation with the Department of Justice, has taken the position that the state must file and prosecute a lawsuit before a Consent Decree can even be considered.

Thus, we are being told that to achieve our goal of entering into an enforceable agreement, we must take the very steps we have been seeking to avoid - protracted and expensive litigation. The state believes that the money that would be spent on litigation would be better spent on cleaning up Hanford. Apparently, DOE does not agree.

These are but two examples of Energy's current general position, i.e., RCRA may apply to Energy facilities, but is largely unenforceable by the various states because of sovereign immunity. Sovereign immunity is the major impediment to effective state enforcement of environmental

laws at federal facilities. Energy, the Department of Defense, and the Department of Justice will not hesitate to use the defense to whatever advantage they can.

Consequently, it is imperative that H.B. 3785, sponsored by Representative Lukin, be enacted as quickly as possible. The State of Washington wholeheartedly supports H.B. 3785, and views it as one of the keys that will lead to environmental compliance at Hanford and other federal facilities.

A comparison with the Ohio experience is appropriate here. Ohio, after lengthy and difficult negotiations regarding the Fernald facility, was forced to sue DOE. After three years of litigation, DOE finally, in November of 1988, signed a Consent Decree regarding the Fernald facility.

Like Ohio, the State of Washington has negotiated, at great length, with DOE. We have repeatedly told DOE that we would like to avoid the cost and delay inherent in litigation by entering into an "agreed to" nonadversarial Consent Decree. But, it appears, at this point in time, that like Ohio we will be forced to litigate to get a Consent Decree.

We have also discussed a Hanford agreement that would not take the form of a Consent Decree. With clear and unambiguous enforceability language, and the Department of Justice's signature, the state may be able to accept a

"non-Consent Decree" agreement. Again, however, DOE and Justice have refused to enter into such an agreement.

It comes down to this: DOE will not sign a Consent Decree unless the state files and prosecutes that lawsuit to the best of our ability; DOE also refuses to sign an enforceable "non-Consent Decree" agreement; DOE will only sign an agreement that allows it to raise its usual defenses, including sovereign immunity, and which are not binding on the Department of Justice in any case.

In short, it is becoming painfully clear that our only recourse is litigation. The Department of Energy has eliminated all other satisfactory alternatives.

My second major focus here today is funding. The total cost of Hanford cleanup is unknown. Present estimates range from over 27 billion to over 57 billion dollars. The estimated duration of the cleanup ranges from 30 to nearly 50 years. The cost of the planned vitrification plant, a crucial facility to Hanford cleanup, will cost an estimated 1.2 billion dollars alone.

It is absolutely essential to a timely and effective cleanup of the Hanford site that a dependable funding source be created. I am confident that if we are forced to rely on the usual budget process to fund this and other DOE cleanup efforts, the cleanups may literally never be completed.

The cleanup of these facilities should also be recognized as a national, not a local, problem. The plutonium produced at Hanford was used in the defense of the United States, not just Washington State. The federal government, not Washington State, should pay for a timely and effective cleanup of all Energy facilities, including Hanford.

One possible approach to the funding problem is to establish a source of funds which is separate from DOE's budget. Something like the Superfund created by CERCLA may be an appropriate device in this regard. We support the concept and goals of S. 2189, the Adams/Bonker Trust Fund Bill, which was introduced in the 100th Congress last year.

Two final notes on funding. First, Energy cannot be allowed to concentrate cleanup funds on active production facilities to the exclusion of nonproduction facilities. Many of the worst environmental problems at DOE facilities are at facilities now or soon to be inactive. It would be short-sighted and, in the long run, more expensive to unduly focus cleanup funds on active (production) facilities.

Secondly, DOE must acknowledge and respond to the vast potential problems at these facilities. To wait until potential problems are imminent dangers is similarly short-sighted, not to mention dangerous.

TESTIMONY OF RICHARD F. CELESTE, GOVERNOR OF OHIO

BEFORE THE

SENATE GOVERNMENTAL AFFAIRS COMMITTEE

Senator Glenn, Members of the Committee, thank you for the opportunity to testify today about Ohio's concerns relating to the management and cleanup of the nation's nuclear defense production complex.

I want to pay special tribute to the leadership that Senator Glenn has shown on this issue, both in championing it in the Congress and in bringing it to the public's attention.

Partly as a result of the efforts of Senator Glenn and others, the nation's nuclear weapons production complex has come under intense public scrutiny during the past six months. After more than four decades of operating in total secrecy, the complex began to crumble in ways that could no longer be hidden from public view. Aging reactors at Hanford and Savannah River were called into question. The historic mismanagement of the facility at Fernald, Ohio, was brought into sharp focus.

The public realized that the federal government had been operating a potentially dangerous network of facilities--strewn across the country in 23 different states--with none of the kind of safety precautions or accountability procedures it imposed on commercial nuclear reactors. What Americans saw was a disturbing example of their government not practicing what it preached--and regulated.

The bottom line remains that it may cost USDOE up to \$200 billion to clean up its production facilities. This is the same amount that USDOE spent over 40 years at the site but only a fraction of what has ever been spent to contain environmental damage.

During the campaign and after, President Bush pledged his Administration to a new era of leadership in environmental protection. This pledge will not be met unless the President makes a different kind of commitment than the previous administration and provides the leadership necessary to back it up.

Because you are already familiar with the problems that plague the complex nationally, I would like to focus my remarks on my impressions of the DOE weapons production facility--officially called the Feed Materials Production Center--in Fernald, Ohio, a small town just northwest of the Cincinnati metropolitan area.

My visit to the site last November left me with three important impressions. The first is the sheer magnitude of the problem, and the subsequent effort necessary to solve it. The second is the need for commitment and leadership to do something different from what has historically been done at facilities like Fernald. The third is the new spirit of cooperation that has been evolving among the federal government, the Department of Energy, the states and their own environmental protection agencies.

The executives from Westinghouse who met me there summed up the problems and the solutions well. They told me they were frustrated because they didn't know enough about the Department of Energy's plan to clean up the facility. And that if I did nothing else upon my return to Columbus I should fight for sufficient appropriations--and the leadership from Washington--to do the job.

As you know, USDOE has admitted that the federal government operated this facility with little regard for its impact on the environment or the health and safety of workers and area residents--for thirty-five years.

But that statement gives you no indication of what happened: What happened while the government kept its Fernald secret for 35 years. What happened while government inspectors were discovering places that have since become legends like Love Canal? What happened while--at the same time--they kept us out of Fernald, Ohio?

As buildings and equipment deteriorated, the surrounding acreage became a giant waste storage site. Tens of thousand of containers of hazardous and radioactive wastes were stacked and stored around the plant. Hazardous, toxic, and radioactive wastes were dumped into leaky waste pits. In a final irony, our atomic supremacy came back to haunt us--two K-65 silos containing thousands of tons of uranium tailings (pronounced tailings) from the Manhattan project deteriorated to the point that they pose an immediate health threat to the surrounding community.

What happened to the rest of the country while the massive nuclear sewer at Fernald backed up? Over the last two decades, the nation has learned the hard truth: you cannot pollute what you have because there is nowhere else to go. The frontier is gone. This is it. We must protect our air, land, and water if there is to be anything left for our children. And what we have polluted, we must clean up.

While the K-65 silos were deteriorating, private industry was learning its lesson. Both Congress and the states laid down stringent pollution control laws that allow no good excuses, much less bad ones. In response, companies have been required to commit tremendous resources to environmental protection and cleanup. If a private company owned Fernald, it would rank as one of the worst, if not the worst, Superfund sites in the Midwest. If USDOE were a private business, both the U.S. and the Ohio Environmental Protection Agencies would be prosecuting it to the

fullest extent of the law, not only to ensure cleanup but to impose severe penalties as well.

While the workers at Fernald stacked drums of hazardous radioactive waste on top of one another, the same federal government that imposed stringent environmental laws held itself unanswerable to them, particularly at its defense production facilities. They were off limits to any inspection by state health and safety personnel. Not knowing the danger, Ohioans trusted the United States Government, believing that it would protect them from whatever was going on in those gray buildings behind the high fences.

After I took office in 1983, my administration pushed for access to these facilities in Ohio to make our own determination of the safeness of these facilities. We had to go to court to force DOE to allow our people to inspect. We were appalled at what we discovered. And we are increasingly concerned as each new investigation reveals even greater contamination.

There is some potentially good news, however. If we act decisively--now--we can prevent massive contamination from the waste seeping into the water supply feeding the rural community. If we act decisively--now--we can do the right kind of environmental clean-up. If we act decisively--now--we have a second chance at Fernald to do the right thing.

Today we are winning the legal battles, and other states are following our example. In the last two months, Ohio Attorney General Anthony Celebrezze has worked on two historic agreements with the US Department of Energy. While he will discuss them in detail during his own testimony, I would like to emphasize that the Fernald agreement does not address the vast contamination problems that exist there. These are still being uncovered. And eventually they must be dealt with.

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We are proud of what we have accomplished--but it is not enough. We are pleased that implementation of these agreements is underway--but it is not enough. We are gratified that other states are now using these agreements as models for securing federal cooperation--but it is not enough. We still have no commitment for the comprehensive cleanup of the Fernald site, which may cost anywhere from \$1 billion to \$5 billion.

In fact, rather than clean up this facility, USDOE now proposes to close Fernald and move its operations to other facilities. Consistent with historic trends, the 2010 Report, a blueprint for the future of the federal nuclear weapons production complex, favors production over cleanup. It shows beyond doubt that the DOE prefers to construct new facilities, and leave environmental restoration of old facilities with far less than is necessary to accomplish the job.

This report is one of several reports that have come out recently. All come up with different numbers--both as to the size of the damage and the amount of money needed to clean it up. This seeming confusion only holds us from beginning the work we need to do.

I support an adequate national defense, of which the nuclear weapons production complex is an important element. But I am adamant that the cost of cleaning up Fernald is not a discretionary budget item that can be set aside or underfunded. As Senator Glenn has repeatedly declared, the amount set aside in President Reagan's 1989 budget for the clean-up is entirely inadequate. Environmental cleanup is a crucial and indispensable part of the cost of weapons production and it must be given the same weight and priority as modernization and new weapons production.

The first step in making cleanup a priority is to determine the extent of the contamination. USDOE still has not completed this critical step. Why not? Until these investigations are complete, all estimates are guesses. That's the immediate problem. When those investigations are complete and the costs known, we must proceed with a fixed schedule for change.

Moreover, I would like to repeat my call for a panel of experts to be formed to monitor the clean-up, its costs and timing. The panel should meet the highest national standards, the kind evident in the Challenger review panel, which had a former secretary of state as well as leaders of undisputed independence and integrity, to look at the reality of the disaster, determine its causes and monitor its solution.

Such a panel is important because the costs of constructing new facilities will compete with the escalating costs of cleanup. DOE must make cleanup as much a part of its mission as production, and it must offer a more coherent plan for dealing with what is fast becoming the nation's most costly environmental cleanup project. But I also believe the independent board must monitor DOE's fulfillment of this plan.

Finally, we must make certain that the DOE facilities are subject to the same EPA standards as the private sector and NIOSH inspection.

Other governors share my frustration about the lack of knowledge as well as the lack of governmental commitment to and understanding of the problems and the solutions. In a demonstration of unity on these issues, I joined Governors Romer of Colorado and Andrus of Idaho along with three other governors recently in sending a letter to President Bush requesting that he work with the governors and Congress to come up with a plan for timely cleanup of these sites.

In the letter, you will see us ask for:

- ** A comprehensive cleanup of federal facilities. A partial cleanup isn't good enough.
- ** The establishment of a cleanup schedule that will be adhered to. The vague conclusion of the 2010 Report -- that cleanup can go on indefinitely is unacceptable. The cleanup schedule needs to provide target dates for completion of remedial investigations as well as cleanup.
- ** Adequate funding for the job. So far, federal proposals vary so widely that we don't know how much is truly required. In the 2010 Report, the Energy Department proposed spending \$81 billion for environmental safety and health activities. The U.S. General Accounting Office, however, has said it will cost as much as \$155 billion. And the 2010 Report makes clear that the cleanup amount is an installment with full remediation postponed until after the year 2010.

The DOE Environmental, Safety and Health Report, issued earlier this month, estimates that cleanup costs at DOE weapons production facilities will range from \$53.4 billion to \$91.7 billion, with yearly operating costs for environmental, safety and health base programs averaging \$1.8 billion a year from 1989 to 2010. Now we have Volume II of the Environmental, Safety and Health Report that places the price tag for cleanup nationwide at \$200 billion.

Yet President Reagan's budget request for Fiscal Year 1990 is only \$315 million for the cleanup of all DOE weapons production facilities (or \$1.4 billion if you include base operations and other activities) a fraction of the amount needed even to begin the job. As you have noted before, Mr.

Chairman, this amount is completely inadequate and does not begin to represent a serious commitment to deal with the problem. Until all remedial investigations are complete, we will not know the cost of the cleanup. These investigations must be completed soon.

- ** An effective regulatory structure that clarifies the applicability of federal and state environmental protection laws to federal facilities. The federal government must be subjected to these regulations to protect public health and safety as well as the environment. Holding the federal government to the same standards imposed on the private sector would help restore public confidence. If hard choices are not made on safety, health, and environmental protection, the credibility of the production program will never recover.
- ** Oversight and accountability. The most complete breakdown of the federal nuclear weapons production complex indicates how essential accountability is to good government. Establishing an adequate regulatory structure will ensure accountability and restore public confidence in the government's ability to handle and dispose of wastes safely.
- ** Development of advanced cleanup technologies. Safe, efficient, and cost-effective cleanup and disposal of wastes at these facilities will require a new generation of technology. The federal government must take the lead in developing this technology as quickly as possible.

A few weeks ago, an Energy Department official said that complete cleanup of the Fernald site would not be economically or technologically feasible. That it might be necessary to clean up the most threatening problems at Fernald and leave the rest to time and nature.

After thirty-seven years of service, the citizens of Ohio -- and of our nation -- deserve better than this. They deserve swift action and strong leadership from our new President.

Thank you.



OFFICE OF THE GOVERNOR

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CECIL D. ANDRUS
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Prepared Remarks of

Cecil D. Andrus

Governor of Idaho

before the

Senate Governmental Operations Committee

Dirksen Senate Office Building

Washington, D.C.

January 26, 1989

For Delivery: 9:30 a.m. (EST)

Mr. Chairman, members of the Committee:

I appreciate the opportunity to appear before you today to discuss several issues that are of critical importance to the people of Idaho and to the nation.

First, by way of background, let me say that for nearly 40 years the state of Idaho has been home to the Idaho National Engineering Laboratory which is located near Arco, Idaho. The sprawling federal reservation has an international reputation because of the tremendous work that has been done there over the years in the areas of research, safety and development of new nuclear technology. Of course, the facility is also very important to our nation's security.

INEL is also a major component of our state's economy. The site directly employs about 10,000 Idahoans and contributes millions of dollars annually to the Idaho economy.

The INEL facility is currently the preferred site for important new DOE projects. The site has a promising future, but it is a future that can only be assured if serious concerns about past and present waste management are addressed in a comprehensive manner.

Mr. Chairman, as good citizens of the United States, Idahoans have been willing for more than 20 years to do our part to accommodate the "temporary" storage of low-level and transuranic waste at INEL. That waste is generated at a number of sites across the nation. We have accepted the "temporary" storage assignment with the full understanding

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that this waste, which has now grown to 2.4 million cubic feet of material, would be transferred to permanent storage elsewhere.

In fact, in 1973, I was promised that the waste would be removed from Idaho by the end of the decade of the 70's. More recently we were told the waste would begin moving out of Idaho in October of last year. That promise, too, was not kept by the Department of Energy.

On October 19, 1988, I informed then-Secretary of Energy, John S. Herrington, that from that date forward the borders of Idaho would be closed to transuranic and low-level waste shipments destined for storage in Idaho. I took that step after being told, yet again, that there would be more delays in the opening of DOE's Waste Isolation Pilot Plant near Carlsbad, New Mexico. The 120,000 barrels of transuranic waste storage in Idaho are eventually destined for storage at WIPP.

As good Americans, concerned about national security and the development of the nuclear industry, we have done our part for 20 years. But at some point patience runs out. We have been lied to once too often. Idaho has kept its part of a difficult bargain, but the federal government and the Department of Energy has not kept its word to us.

Lately we have been told that it will be many more months before the WIPP facility is operational.

Mr. Chairman, this situation underscores one terribly important point that we must come to grips with in the United States. If, as a nation, we cannot find safe, environmentally acceptable means of storing the waste we produce, we had better stop producing it.

I can only hope that the new Secretary of Energy, the new Administration and you and your colleagues will insist on focusing new attention and resources on the waste management issue. For too long, it seems to me, we have devoted the vast share of our resources to the front end--the production end--of the cycle. Many fewer resources have been devoted to the back end--the waste handling end--of the cycle.

In Idaho, in addition to the above ground "temporarily" stored waste we have the added concern of vast amounts of buried waste at INEL. In the 1950's and 60's the acceptable waste disposal technique was to bury this waste in the desert. Now, 20 and 30 years later we are discovering the folly of that practice.

It is absolutely essential that DOE and the Congress allocate the necessary resources to clean-up that buried waste at INEL. It will be an expensive project, but there is simply no alternative. I have insisted with DOE that the waste be dug up, re-packaged and removed. Anything less will not assure the environmental integrity of INEL and the state of Idaho.

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Mr. Chairman, I would like to leave you with several specific suggestions that I believe will go a long way toward properly addressing the concerns I have outlined this morning.

1) It is essential that the Congress engage in responsible and aggressive oversight of all aspects of DOE's waste management program. Your watch dog role is critical.

2) It is essential that the Congress address, in this session, the necessary legislation to facilitate the opening of the Waste Isolation Pilot Plant.

3) It is essential that the necessary resources are made available for clean-up of waste problems at DOE facilities across America. The administration and the Congress must confront the issue squarely. The future of DOE facilities across the nation is tied directly to the priority the federal government places on cleaning up the problems of the past.

4) It is essential that we acknowledge the fundamental truth I mentioned earlier. If waste material is going to be generated, we must have a workable plan for its disposal. We simply cannot generate waste material and hope that it will somehow take care of itself.

Mr. Chairman, thank you very much. I will be happy to respond to questions.

--the end--

Testimony by
Roy Pomer
Governor of Colorado

Submitted to the
Committee on Governmental Affairs
United States Senate

January 26, 1989

I appreciate this opportunity to appear before you concerning an issue of great importance to the citizens of Colorado.

Rocky Flats is a critical facility in the nation's nuclear weapons production system. Rocky Flats also has been one of the most contentious political and environmental issues in the state's history. Citizen concern about the operations of the facility has never been higher. As public officials, we are obligated to respond to citizen's demands for answers regarding ongoing operations and past environmental contamination.

Today I want to highlight several current issues of concern to myself and to the 1.5 million residents of the Denver metropolitan area who live near the plant. In fact, it is important for you to know that the plant is located just 16 miles from downtown Denver.

I. The Waste Storage Crisis at Rocky Flats

The first issue concerns the highly publicized short-term disposal situation. As you may know, Rocky Flats generates the majority of transuranic wastes to be disposed of at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. Recently, Governor Cecil Andrus banned further shipments of Rocky Flats wastes to the Idaho National Engineering Labs where they are supposed to be stored temporarily. The U.S. Department of Energy (DOE) chose to respect Governor Andrus' ban, and as an alternative DOE asked me if I was willing to expand storage capacity at Rocky Flats. I refused because additional storage of wastes at the plant poses an additional threat to residents of the metropolitan area.

Under Colorado law, the state has regulatory authority over the management and disposal of hazardous wastes generated at the facility. The wastes bound for WIPP are contaminated with hazardous materials and therefore, fall under such regulatory authority. Under an interim agreement with the DOE, our regulations allow only a limited quantity of wastes - 1600 cubic yards - to be stored temporarily on site. At the present rate of waste generation, the plant will exceed this limit sometime in May 1989.

I made a firm decision not to allow the plant to expand this storage. Just as Governor Andrus could no longer allow his state to serve as a de facto disposal site, neither could I. Rocky Flats

was never intended to be an interim storage facility. The plant already has other waste streams and cleanup problems and certainly is not equipped to become a long-term storage facility. At a December meeting in Salt Lake City, which included the Governors of Colorado, Idaho, and New Mexico, DOE officials agreed not to exceed state storage limits.

I chose not to expand the capacity for Rocky Flats storage because of the added danger it would create and because I am convinced the federal government has better alternatives for storage outside of a metropolitan area. We must find a better solution. I believe that WIPP is the long-term solution. However, it is not likely that WIPP will open until this fall at the earliest. Therefore, we must find an interim solution for disposal of waste from Rocky Flats.

I do not want this plant closed over the short-term waste disposal problem. It would be wrong to do that. However, it is an action I will take if I have to. Closing Rocky Flats would be unfair to the employees and unwise with regard to the production that we depend upon for national security. I am convinced that the U.S. Department of Energy can find that solution and I have urged them to put it on the table. They are busy working on this solution today. And I am confident that involved Western governors, the DOE and Congress can work together to help find a permanent solution in 1989.

Therefore, my position is that we should find an alternate place to store waste on a temporary basis. But that site cannot be in a

metropolitan area. And we should find a temporary storage site immediately so that Rocky Flats will not have to be closed temporarily at this time.

II. The Modernization Study

My refusal to expand waste storage so close to a metropolitan area, brings me to my next concern, the long-term future of the Rocky Flats plant. My position is as follows:

The Rocky Flats plant should be permitted to continue to operate at its present location for its useful life, but only if it is operated safely. However, it should not be rebuilt at that location. It would be wrong to rebuild a facility handling plutonium in a metropolitan area of 1.5 million people. Once its useful life is consumed and if it needs to be rebuilt, it should be relocated away from a metropolitan area.

But in order to continue operating the plant safely, DOE will need to make strategic investments in certain facilities such as Building 371. I support additional investments which will assure the safety of the workers and provide better overall environmental protection. DOE must make the necessary renovations to bring the plant to an acceptable level of safety and to restore public confidence.

III. Long-term Environmental Cleanup

This leads me to my last area of concern, environmental cleanup at Rocky Flats.

I was stunned by the newspaper accounts of the immense size of cleanup operations necessary at DOE facilities nationwide. The pricetag for Rocky Flats is more than \$1 billion, and I fear this cost will grow. The magnitude of the problem is staggering and many skeptics suspect the federal government will be forced to accept less than complete environmental cleanup or a "national sacrifice zone." I understand national sacrifice zone to mean a piece of ground so severely contaminated that it is not worth the expense to clean it up. Instead, a concrete fence could be placed around it to keep people away for the next 100,000 years.

This is not an acceptable solution for the citizens of Colorado. I prefer not to think of national sacrifice zones, but rather, national cleanup zones. We must begin to fashion a program of federal leadership which comprehensively addresses - funding, prioritization of cleanup, a schedule for completion and effective state and federal oversight. I am anxious to work with you on these difficult issues.

Regarding funding, I urge Congress to begin now to appropriate funds to address the most critical environmental threats that exist today. Dollars spent well today will prevent us from having to

spend tenfold the amount years from now. This is why a national prioritization system is probably the most efficient and effective way to spend limited dollars.

I support DOE's effort to rank the environmental hazards in its recently released environmental survey of its facilities. As you may know, a group of inactive waste sites at Rocky Flats, one of which is referred to as Hillside 881, were ranked as the top potential environmental threat of all DOE facilities. Hillside 881 is the result of years of dumping of chemical solvents. These solvents have begun to migrate through the soil into groundwater on-site and toward off-site public water supplies. This high ranking resulted because the study placed heavy emphasis on environmental hazards which potentially could lead to substantial exposure of large populations. Because of the plant's proximity to several municipal water supplies, DOE assumed a worst case scenario of water supply contamination.

This scenario has not yet happened and current municipal water supplies are safe to drink. But it will happen if we wait too long to act. Hillside 881 is an example of where the cost of cleanup and the impacts on public health will be much higher if we wait until the damage is done. DOE officials in Albuquerque and at Rocky Flats began working with the Colorado Department of Health on this situation long before the publication of the environmental survey. I have toured Hillside 881 and reviewed DOE's containment and cleanup plans. DOE officials tell me they are working

to accelerate cleanup activities at this site and, in the next year, plan extensive operations to stem the flow of contaminated water. I will watch the cleanup closely.

Hillside 881 is just one of more than over 70 inactive waste sites at Rocky Flats contaminated with hazardous and radioactive wastes. In 1986, the state, the EPA and the DOE entered into a compliance agreement stipulating a plan of action for investigating and cleaning up many of these waste sites. Together, the Colorado Department of Health, the EPA and Rocky Flats are working on ways to proceed with cleanup.

Both on-site and off-site contamination from prior waste management operations remains a central concern to neighboring communities. Over the last 20 years, metropolitan communities have grown closer and closer to the Rocky Flats buffer zone of safety. Currently, public officials are considering construction of the western portion of Denver's beltway over areas of land with low levels of plutonium which settled in the soils from leaking storage drums at the plant.

I encourage Congress to consult the DOE's environmental survey and to carefully review its methodology. The study's emphasis on potential exposure to human populations provides a guide for planning preventative action investments. My staff is studying the report in greater detail. One particular concern we have is the environmental and public health implications of off-site radiation contamination.

One of the more contentious issues surrounding the Rocky Flats facility remains the issue of whether a long-term public health risk exists from the presence of low levels of plutonium found in the soils just off the plant site and in the sediment in the lake bottoms that serve as water supplies. In addition, ongoing air emissions from the facility are a continuing concern to neighboring residents.

Years of scientific debate, lawsuits and DOE assurances have failed to resolve these issues in the public's mind. Unfortunately, the scientific community remains divided about the real health effects of low-levels of radioactivity. Therefore, a much more thorough analysis of potential health risk and exposure is needed for the facility.

Finally, I believe the plant should be operated safely. I am anxious to work with Congress and the DOE on keeping the plant safe and cleaning up the environmental damage.

That concludes my testimony.



Attorney General
Anthony J. Celebrezze, Jr.

WRITTEN TESTIMONY

OF

ANTHONY J. CELEBREZZE, JR.

OHIO ATTORNEY GENERAL

BEFORE THE

U.S. SENATE

GOVERNMENTAL AFFAIRS COMMITTEE

DIRSKEN SENATE OFFICE BUILDING

ROOM 340

WASHINGTON, D.C.

9:30 A.M.

THURSDAY, JANUARY 26, 1989

Mr. CHAIRMAN, MEMBERS OF THE COMMITTEE, I AM ANTHONY J. CELEBREZZE, JR., ATTORNEY GENERAL FOR THE STATE OF OHIO. I APPRECIATE THE OPPORTUNITY TO BE WITH YOU TODAY AND SHARE MY OPINIONS ON THE ENVIRONMENTAL PROBLEMS CREATED BY FEDERAL FACILITIES. I PLEDGE MY SUPPORT TO YOU AS YOU BEGIN THE ESSENTIAL WORK OF ENSURING THAT NEEDED POLICIES AND FUNDING MECHANISMS ARE DEVELOPED TO CLEAN UP PAST ENVIRONMENTAL CONTAMINATION AND ENSURE SAFE FUTURE OPERATIONS AT FEDERALLY OWNED SITES. I ASK THAT BOTH MY TESTIMONY AND THE PREPARED STATEMENT I HAVE SUBMITTED BE MADE A PART OF THE OFFICIAL RECORD OF THIS COMMITTEE.

YOU HAVE ASKED ME TO ADDRESS A VARIETY OF DOCUMENTS RECENTLY RELEASED BY THE UNITED STATES DEPARTMENT OF ENERGY AND THE ADMINISTRATION, INCLUDING THE AGENCY'S FISCAL YEAR 1990 BUDGET REQUEST, PRIORITIZATION REPORT, AND THE 2010 STUDY. IN ADDITION, I AM PREPARED TO UPDATE YOU ON THE STATUS OF CLEAN UP AT FEDERAL FACILITIES IN OHIO.

ONE SIGNIFICANT POINT TO MAKE CONCERNING ALL DEPARTMENT OF ENERGY REPORTS IS THAT RECOMMENDATIONS ARE ONLY AS ACCURATE A DEPICTION OF REALITY AS THE TRUTHFULNESS OF THE FACTS ON WHICH THEY ARE BASED. AFTER NEGOTIATING WITH THE DEPARTMENT OF ENERGY FOR THE LAST FIVE YEARS OVER THEIR OPERATIONS AT THE FERNALD PLANT, THE PORTSMOUTH GASEOUS DIFFUSION PLANT AT PIKETON, AND NOW OVER THEIR MOUND SITE IN MIAMISBURG, I AM NOT CONVINCED OF THE AGENCY'S ABILITY TO PROVIDE FACTUAL DATA OPENLY IN EVERY INSTANCE.

PART OF THE REASON FOR MY SKEPTICISM STEMS FROM THE RECOGNITION THAT OUR KNOWLEDGE OF HOW TO DETECT AND RECTIFY ENVIRONMENTAL POLLUTION IS STILL SOMEWHAT LIMITED, PARTICULARLY WHEN DEALING WITH POLLUTION CAUSED BY RADIOACTIVE WASTE.

ANOTHER FACTOR IS THAT THE DEPARTMENT OF ENERGY FOR TOO LONG HAS OPERATED IN THE VACUUM OF ITS OWN CONSCIENCE. SHROUDING ITSELF IN THE VEIL OF SOVEREIGN IMMUNITY, OBFUSCATING DETAILS OF ITS ACTIONS UNDER THE GUISE OF NATIONAL SECURITY, THE AGENCY BELIEVED ITS ONLY ACCOUNTABILITY WAS TO ITSELF. THIS TYPE OF ATTITUDE CAN BREED IRRESPONSIBILITY, AND I CAN BEAR WITNESS TO THE AFTER EFFECTS OF SUCH ARROGANCE.

THE DEPARTMENT OF ENERGY HAS MADE SIGNIFICANT PROGRESS. AFTER SIGNING TWO LANDMARK CONSENT DECREES WITH THE DEPARTMENT OF ENERGY OVER THE FERNALD SITE, AND GAINING A COMMITMENT FOR A SIMILAR DECREE GOVERNING THE OPERATIONS AT PIKETON, WE IN OHIO BELIEVE THAT THE AGENCY IS ON THE ROAD TO POSITIVE CHANGE, AND WELCOME THE NEW ATTITUDE.

DURING THE EARLY STAGES OF THEIR TRANSITION, THOUGH, HEALTHY SKEPTICISM IS CRITICAL. SENATOR GLENN AND MEMBERS OF THIS COMMITTEE HAVE TAKEN A LEAD ROLE IN BRINGING ABOUT THE DEPARTMENT OF ENERGY'S REVERSAL, AND I AM SURE YOU WILL AGREE THAT ONLY THROUGH TOUGH QUESTIONS AND DILIGENT PRESSURE WILL WE ACHIEVE OUR FINAL GOALS OF CLEAN-UP AND FUTURE COMPLIANCE.

OUR CONSENT DECREE IS SIGNIFICANT, BUT ITS TRUE RESULTS COULD BE DILUTED IF THE DEPARTMENT OF ENERGY IS NOT FORTHRIGHT IN ASSESSING ITS CONTAMINATION PROBLEMS AND REQUESTING APPROPRIATE FUNDS TO ABATE THESE PROBLEMS.

MY CONCERN WITH THE PRELIMINARY BUDGET REPORTS SUBMITTED BY THE DEPARTMENT OF ENERGY IS THAT THEY SEEM TO SKETCH ONLY THE OUTLINES OF PROBLEMS. IMPORTANT SHADING AND DETAIL APPEAR TO BE MISSING. FOR EXAMPLE, WHEN REVIEWING THE PRIORITIZATION REPORT PREPARED BY THE DEPARTMENT OF ENERGY I FOUND IT LACKING SIGNIFICANT DATA ON ENVIRONMENTAL RISKS POSED BY ITS FACILITIES. IT DOES NOT ADDRESS ALL CONTAMINATION SOURCES AT THE FERNALD PLANT SUCH AS THE RECENT DISCOVERY OF HIGH CONCENTRATIONS OF URANIUM IN THE SOIL AND GROUNDWATER UNDER PRODUCTION PLANT 6.

FURTHER, THE REPORT RANKS ONLY THE RISKS ASSOCIATED WITH EACH IDENTIFIED SOURCE ON A SITE, NOT THE RISKS CAUSED BY THE SITE IN ITS ENTIRETY. THIS STRATEGY IS A LITTLE LIKE EVALUATING A SYMPHONY ORCHESTRA JUST BY ITS CELLOISTS. PINPOINTING SPECIFIC CONTAMINATION IS NEEDED TO ENSURE APPROPRIATE CLEAN-UP, BUT EACH FACILITY'S OVERALL ENVIRONMENTAL IMPACT SHOULD BE THE BASIS FOR DEVELOPING A PRIORITY LIST.

THE REPORT INTRODUCTION NOTES THAT IT IS THE PRODUCT OF PRELIMINARY RESEARCH. OBVIOUSLY, IT IS INCUMBENT UPON THE DEPARTMENT OF ENERGY TO COMPILE MORE COMPLETE INFORMATION AND REEVALUATE THE RANKINGS IN THIS REPORT BEFORE FUNDING FOR IDENTIFIED PROBLEM AREAS CAN BE ADEQUATELY PRIORITIZED.

THE DEPARTMENT OF ENERGY'S DOSE RECONSTRUCTION STUDY SUFFERS FROM SIMILAR DIFFICULTIES. IN THIS INSTANCE, HOWEVER, IT APPEARS THAT THE AGENCY IS CRIPPLED SOMEWHAT BY SLOPPY RECORD-KEEPING PRACTICES FROM TWENTY AND THIRTY YEARS AGO. THEY ARE UNABLE TO MAKE ACCURATE ESTIMATES OF THE TOTAL RELEASES OF URANIUM AND OTHER RADIONUCLIDES BECAUSE MANY OPERATIONAL RECORDS FROM THE 1950'S AND 1960'S, THE TIME FRAME DURING WHICH MOST OF THE RELEASES OCCURED, HAVE BEEN LOST OR DESTROYED.

IN ADDITION, THE AGENCY CONTINUES TO DISCOVER PREVIOUSLY UNACCOUNTED FOR SOURCES AND DOCUMENTS WHICH INDICATE THAT ACTUAL RELEASES WERE MANY TIMES GREATER THAN OFFICIALLY REPORTED. AGAIN, THE WHOLE STUDY WILL BE QUESTIONABLE UNLESS THE AGENCY CAN PROVIDE A MORE ACCURATE PORTRAIT OF ALL RELEASES.

THE RESTRICTIONS ON OUR DEGREE OF CERTAINTY WITH DEPARTMENT OF ENERGY PROJECTIONS ARE NOWHERE MORE APPARENT THAN WHEN DEALING WITH BUDGETARY PROJECTIONS FOR CLEAN-UP AND CONTAINMENT PROCEDURES.

I HAVE HAD AN OPPORTUNITY TO REVIEW THE ENVIRONMENTAL SAFETY, AND HEALTH NEEDS ASSESSMENTS COMPILED BY THE AGENCY. THESE DOCUMENTS CONTAIN COST ESTIMATES COMPILED BY FIELD AND PROGRAM OFFICES PERTAINING TO THE ENVIRONMENTAL "NEEDS" OF 45 SPECIFIC SITES, INCLUDING THE THREE OHIO FACILITIES. THE COSTS ARE FOR THE FOLLOWING TYPES OF ENVIRONMENTAL ACTIVITIES: 1) BASE PROGRAMS FOR DAY-TO-DAY OPERATIONS THROUGH THE YEAR 2010; 2) CORRECTIVE ACTIONS TO BRING THE FACILITIES INTO COMPLIANCE WITH ENVIRONMENTAL LAWS; 3) REMEDIAL ACTIONS FOR THE ASSESSMENT AND CLEAN-UP OF CONTAMINATED SITES; 4) OTHER SAFETY AND HEALTH ACTIVITIES INCLUDING DECONTAMINATION AND DECOMMISSIONING OF INACTIVE SITES.

THE TOTAL ENVIRONMENTAL NEED AT THOSE 45 SITES WAS ESTIMATED TO BE BETWEEN \$53.4 AND \$91.7 BILLION. REMEDIAL ACTION ALONE, WHICH IS BELIEVED NECESSARY AT 37 LOCATIONS, IS ESTIMATED TO COST ANYWHERE FROM \$35.4 TO \$64.9 BILLION. FURTHER, THIS FIGURE DOES NOT REPRESENT POTENTIAL PROBLEMS WITH OFF-SITE CONTAMINATION AND THEREFORE UNDERESTIMATES THE ACTUAL COST.

EVEN BY TODAY'S STANDARDS, THESE NUMBERS ARE STAGGERING TO THE IMAGINATION AND CLEARLY DEMONSTRATE THAT A SERIOUS THREAT EXISTS TO HUMAN HEALTH AND THE ENVIRONMENT DUE TO THE EXTENT OF CONTAMINATION. * IT IS INCONCEIVABLE THAT WITH THESE FIGURES AT HAND, THE DEPARTMENT OF ENERGY REQUESTS ONLY MINIMAL FUNDS FROM CONGRESS TO ADDRESS AND ABATE THIS PROBLEM.

EXAMINE FOR A MOMENT THE DEPARTMENT OF ENERGY'S BUDGET REQUEST FOR FERNALD. AS A RESULT OF THE EXTENSIVE LITIGATION OVER THIS SITE, THE NEEDS ASSESSMENT REPORT INCLUDED SOME SPECIFIC ITEMS FOR CORRECTIVE ACTION CONTAINED IN OUR NEGOTIATED CONSENT ORDERS. THE REPORT ESTIMATED THE TOTAL ENVIRONMENTAL NEED AT THE SITE AT \$5 BILLION, OF WHICH NEARLY \$4 BILLION IS DEDICATED TO REMEDIAL ACTIONS.

IN THEIR BUDGET REQUEST, HOWEVER, THE DEPARTMENT OF ENERGY'S TOTAL ENVIRONMENTAL REQUEST FOR THE SITE IS \$106 MILLION. THIS AMOUNT IS NOT JUST FOR CLEAN UP OF CONTAMINATION FROM PAST OPERATIONS, BUT ALSO INCLUDES FUNDS DESIGNED TO PREVENT FUTURE CONTAMINATION. AN EXAMINATION OF THE BUDGET DOCUMENTS CURRENTLY IN MY POSSESSION DOES NOT DISCLOSE HOW MUCH OF THIS TOTAL FIGURE WILL BE USED FOR CLEAN UP, AS OPPOSED TO DAY-TO-DAY POLLUTION PREVENTION.

EVEN IF IT IS ASSUMED THAT THE ENTIRE AMOUNT WOULD BE DEDICATED TO CLEAN UP, \$106 MILLION AVERAGED OVER THE NEXT 20 YEARS EQUALS \$2.12 BILLION, AN AMOUNT SUBSTANTIALLY LESS THAN THE NEARLY \$4 BILLION PREVIOUSLY SPECIFIED FOR CLEAN UP.

I UNDERSTAND THE NEED TO REVIEW THE SITE IN ORDER TO DETERMINE APPROPRIATE CLEAN UP REMEDIES, AND I AM PLEASED TO SEE THE DEPARTMENT OF ENERGY IS PROCEEDING WITH THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY. THERE ARE, HOWEVER, OBVIOUS REHABILITATION EFFORTS WHICH CAN BE UNDERTAKEN WITHOUT FURTHER STUDY, BUT NO FUNDING HAS BEEN REQUESTED TO PERFORM SUCH ACTIVITIES. FOR EXAMPLE, THE TWO K-65 SILOS CONTAINING RADIOACTIVE WASTE AT THE FACILITY ARE IN POOR PHYSICAL CONDITION. THIS PROBLEM SHOULD BE PROMPTLY RECTIFIED TO AVERT A SERIOUS HEALTH THREAT TO THE CITIZENS OF OHIO.

I NOTE RECENT NEWS REPORTS INDICATING THAT \$80 MILLION HAS ALREADY BEEN SPENT AT FERNALD FOR COMPLIANCE PROCEDURES WHICH MAY BE UNNECESSARY IF THE FACILITY IS CLOSED. I WOULD SUGGEST THAT THE PRESENT CONFUSION ABOUT THE DEPARTMENT OF ENERGY'S LONG-TERM GOALS IS ALREADY HAVING A NEGATIVE IMPACT ON THEIR SPENDING.

ALONG WITH MY CONCERN THAT DOE HAS NOT REQUESTED ADEQUATE FUNDS IN ITS CURRENT BUDGET REQUEST IS THE DISCONCERTING THOUGHT THAT THE DEPARTMENT DOES NOT UNDERSTAND THE ACTUAL AMOUNT OF MONEY REQUIRED TO REMEDIATE THE CONTAMINATION AT THEIR FACILITIES. MY CONCERN STEMS FROM A REVIEW OF THE 2010 STUDY.

THIS REPORT, RECENTLY RELEASED BY THE PAST ADMINISTRATION, APPROXIMATES THAT \$29 BILLION WILL BE NEEDED FOR CLEANUP AND RESTORATION OF ALL FEDERAL FACILITIES IN THE NEXT TWENTY YEARS, A FIGURE FAR BELOW OTHER DEPARTMENTAL ESTIMATES ON THIS SUBJECT.

WHY TWO REPORTS FROM THE FEDERAL GOVERNMENT CONTAIN SUCH SHARP CONTRADICTIONS IN EXPENSE ESTIMATION REMAINS UNEXPLAINED. TAKING INTO ACCOUNT THAT ENVIRONMENTAL CLEANUPS OF THE MAGNITUDE FACING THESE FACILITIES ALWAYS CONTAIN UNKNOWN PROBLEMS AND COSTS, THE STUDY'S UNREALISTIC APPROACH TO THESE SEVERE PROBLEMS CALLS ITS RELIABILITY INTO QUESTION.

FURTHERMORE, NONE OF THE FUNDS FOR CLEANUP AND OTHER ENVIRONMENTAL CONCERNS ARE GUARANTEED. THE 2010 STUDY STATES THAT ANNUAL FUNDING FOR THESE NEEDS WILL BE CONSIDERED IN THE CONTEXT OF THE TOTAL NATIONAL SECURITY REQUIREMENTS IN ANY GIVEN YEAR. THUS, THE STUDY, LIKE THE NEEDS ASSESSMENT, ADMITS THAT CERTAIN IDENTIFIED ENVIRONMENTAL AND HEALTH RISKS WILL NOT BE IMMEDIATELY CORRECTED. AGAIN, SUCH AN APPROACH IS LITTLE CONSOLATION FOR THE CITIZENS WHO MUST CONTINUE TO LIVE WITH THE HEALTH RISKS CAUSED BY THE LAX ATTITUDES OF THE DEPARTMENT OF ENERGY AND ITS PREDECESSOR AGENCIES. THESE FUNDS MUST BE GUARANTEED AND SUFFICIENT DOLLARS BUDGETED TO IMMEDIATELY ADDRESS ALL IDENTIFIED PROBLEMS. A TRUST FUND, AS I UNDERSTAND THIS COMMITTEE IS CONSIDERING, COULD BE ESTABLISHED TO SET ASIDE THE FUNDS NEEDED FOR FACILITIES CLEANUP. SUCH A TRUST FUND WOULD HELP ASSURE THAT THE MONIES NEEDED FOR THIS IMPORTANT WORK WOULD NOT LOSE PRIORITY TO OTHER PROGRAMS OPERATED BY THE DEPARTMENT OF ENERGY.

THE 2010 STUDY RAISES TWO ADDITIONAL QUESTIONS BEYOND FUNDING. ONE IS THE REPORTS' PROPOSAL TO SHUT DOWN ALL NUCLEAR MATERIALS ACTIVITIES AT MOUND AND CLOSE OPERATIONS AT THE FERNALD SITE COMPLETELY.

ACCORDING TO THE 2010, THE MOUND PLANT IS NOW OPERATED IN A SAFE AND ENVIRONMENTALLY ACCEPTABLE MANNER AT TECHNICALLY ACCEPTABLE LEVELS OF RISK TO THE PUBLIC. IT ADDS THAT APPROPRIATE MODERNIZATION SHOULD ALLOW THE PLANT TO CONTINUE TO OPERATE IN A SAFE FASHION. IT RECOMMENDS, HOWEVER, THAT ALL NUCLEAR ACTIVITIES BE TRANSFERRED BECAUSE OF THE GROWING POPULATION DENSITY NEAR THE SITE AND BECAUSE PUBLIC PERCEPTION OF RISK IS SUCH THAT EVEN "INSIGNIFICANT INCIDENTS INVOLVING NUCLEAR MATERIALS MAY RESULT IN MAJOR IMPACTS ON PRODUCTION." A CAPITAL INVESTMENT COST OF \$180 MILLION, PLUS \$75 MILLION FOR TRANSITIONAL OPERATING EXPENSES IS TAGGED FOR THIS TRANSFER.

IT MAY BE TRUE THAT CONSOLIDATING ACTIVITIES COULD BE MORE COST EFFECTIVE FOR THE DEPARTMENT OF ENERGY IN THE LONG-TERM. IT IS TRUE THAT POPULATION DENSITY NEAR THE MOUND PLANT HAS INCREASED GREATLY. BUT WHERE IN THIS COUNTRY IS IT ACCEPTABLE TO OPERATE AN UNSAFE NUCLEAR WEAPONS PLANT? I COULD ADOPT A STATE'S RIGHTS VIEW, AND POINT OUT THAT YES, OHIOANS DON'T WANT TO BE GUINEA PIGS FOR THE DEPARTMENT OF ENERGY, BUT I DON'T THINK OTHER STATES WOULD APPRECIATE THAT TYPE OF JINGOISTIC ATTITUDE. I WOULD LIKE TO KNOW HOW MUCH IT WILL COST THE DEPARTMENT OF ENERGY TO UPGRADE AND OPERATE THAT PLANT SAFELY. IF THOSE EXPENSES ARE LESS THAN THE COSTS TO MOVE, AND HELP TO GUARANTEE THAT THE DEPARTMENT OF ENERGY WILL ADOPT A PROACTIVE RESPONSE TO THE ENVIRONMENT RATHER THAN "LET'S JUST PICK UP AND LEAVE OUR MESS BEHIND" PRACTICE, THEN I THINK THEY SHOULD INVEST IN THEIR EXISTING FACILITIES.

THE SAME PRINCIPLE APPLIES WHEN REVIEWING THEIR REQUEST TO PHASE OUT ALL OPERATIONS AT THE FERNALD SITE BY 1995. FIVE YEARS AGO, THE DEPARTMENT OF ENERGY ARGUED THAT ONE OF THE KEY REASONS FOR DENYING THE STATE OF OHIO THE ABILITY TO ASSERT ENVIRONMENTAL JURISDICTION OVER THE PLANT WAS BECAUSE THE SITE WAS ESSENTIAL TO NATIONAL SECURITY. I AM RELUCTANT TO ACCEPT THAT A SITE, WHICH JUST A SHORT TIME AGO WAS SO INSTRUMENTAL TO FEDERAL DEFENSE POLICIES, HAS SO QUICKLY BECOME UNNECESSARY.

IF THE DEPARTMENT OF ENERGY'S TRUE INTENTIONS ARE SIMPLY TO CLOSE THE PLANT, AND THEN DUPLICATE ITS PRODUCTION PROCESSES BY CREATING A NEW FACILITY ELSEWHERE, THEN I WILL OBJECT STRENUOUSLY TO THEIR PLANS. THIS TYPE OF NEGLIGENCE EVOKES MEMORIES OF THE STEEL INDUSTRY'S ACTIONS DURING THE LAST FIVE DECADES: PLANTS WERE OPENED, NO DOLLARS WERE INVESTED IN MODERNIZATION, AND, WHEN THIS LACK OF LONG-TERM PLANNING BECAME UNDULY BURDENSOME, PLANTS WERE CLOSED, WORKERS LAID OFF, AND AREA ENVIRONMENTAL PROBLEMS CAUSED BY PLANT OPERATIONS WERE IGNORED.

OHIO CANNOT AFFORD TO SUFFER SUCH CALLOUS TREATMENT AGAIN. IT IS UNFAIR TO OUR LABOR FORCE, OUR ECONOMY, AND OUR NATURAL RESOURCES. THE FEDERAL GOVERNMENT, PARTICULARLY THE DEPARTMENT OF ENERGY, HAS A RESPONSIBILITY TO OUR CITIZENS. IF CLOSING THE FERNALD PLANT IS TRULY NECESSARY, I WILL ACQUIESCE TO THAT DECISION ONLY WITH CONCRETE ASSURANCES THAT THE DEPARTMENT OF ENERGY WILL FULFILL ITS COMMITMENT AND REPAIR THE ENVIRONMENTAL DAMAGE CAUSED BY THIRTY-FIVE YEARS OF OPERATIONS.

THE SECOND QUESTION EVOKED BY THE 2010 STUDY IS THE CRITICAL APPROACH TAKEN TOWARD STATE AGENCIES AND THE PUBLIC. THE STUDY MAINTAINS THAT STATE AGENCIES ARE NOT SENSITIVE TO THE DEPARTMENT OF ENERGY'S BUDGET CONSTRAINTS AND NUCLEAR DETERRENCE REQUIREMENTS. I CAN TELL YOU FROM EXPERIENCE THAT OUR CITIZENS AND STATE OFFICIALS ARE JUST AS CONCERNED ABOUT NATIONAL SECURITY THREATS AS ANY FEDERAL AGENCY, WE JUST SEE NO NEED TO POISON OUR CITIZENS AT HOME IN ORDER TO PROTECT THEM AGAINST FOREIGN ENEMIES.

PROPER MANAGEMENT OF NUCLEAR WEAPONS PLANTS SHOULD PROTECT AMERICAN CITIZENS FROM BOTH FOREIGN AND DOMESTIC THREATS. SADLY, IN THE PAST, THE DEPARTMENT OF ENERGY HAS CHOSEN TO IGNORE THE SAFETY OF THE PUBLIC AT HOME WHILE CONCENTRATING ON ITS NUCLEAR MISSION. STATE AGENCIES WORKING IN CONJUNCTION WITH CONCERNED FEDERAL OFFICIALS LIKE SENATOR GLENN AND ORGANIZED CITIZENS GROUPS ARE THE ONLY REASON OHIO WAS ABLE TO ATTAIN THE REMARKABLE PROGRESS IT HAS AT THE FERNALD AND PIKETON PLANTS. ONLY BY FILING LAWSUITS AGAINST THE DEPARTMENT OF ENERGY DID WE FORCE THEM TO THE BARGAINING TABLE. CALLING OUR ACTIONS INSENSITIVE OR IGNORANT OF

NATIONAL SECURITY REMINDS ME OF A FARMER, WHO FAILING TO PLANT THE RIGHT SEEDS OR USE ANY FERTILIZER, TOLD HIS NEIGHBORS THAT HIS FAILED CROP THAT YEAR WAS DUE TO AN ACT OF GOD.

ADDITIONALLY, THE DEPARTMENT OF ENERGY CHARACTERIZES THE PUBLIC'S REAL CONCERNS AS REACTIONARY AND UNNECESSARY. IT IS TRUE THAT THE THREAT OF NUCLEAR EXPOSURE GRATES A RAW NERVE FOR MOST OF OUR CITIZENS, AS DOES DRINKING CONTAMINATED WATER OR DIGESTING FOOD POISONED BY HAZARDOUS WASTE. THIS FEAR CAN TURN INTO HYSTERIA AND CREATE AN UNREASONABLE ATMOSPHERE. ALL THE MORE REASON IN MY OPINION, FOR THE DEPARTMENT OF ENERGY TO COMMIT ITSELF TO CLEAN-UP AND DISPLAY A REASONABLE RESPONSE TO DIFFICULT QUESTIONS. THEY ARE AN AGENCY DESIGNATED FOR THE PUBLIC GOOD, AND NEED TO BUILD AN ATMOSPHERE OF TRUST THAT SIGNIFIES THEIR COMMITMENT TO THAT GREATER GOOD.

IN CONCLUSION, THE 2010 STUDY SETS FORTH A LAUDABLE GOAL THAT THE ENVIRONMENTAL CONTAMINATION AT THE NATION'S NUCLEAR WEAPONS FACILITIES BE REMEDIED. THE STUDY FAILS, HOWEVER, TO ADEQUATELY ESTIMATE AND GUARANTEE THE FUNDS NEEDED FOR SUCH REMEDIATION. IT SUGGESTS MAJOR REORGANIZATIONAL CHANGES IN EXISTING OPERATIONS, WITHOUT PROPER ANALYSIS OF THE COSTS AND BENEFITS GAINED BY SUCH MOVES, AND IT CONTINUES THE DEPARTMENT OF ENERGY'S PAST PRACTICE OF CRITICIZING STATE AGENCIES AND THE PUBLIC FOR THE PRESSURE THEY HAVE EXERTED TO FORCE THE AGENCY TO CORRECT PAST PROBLEMS. KICKING THE PUBLIC CONSCIENCE SUGGESTS ONLY THAT THE DEPARTMENT OF ENERGY HAS NOT QUITE YET ACCEPTED WHAT THE TRUE FOCUS OF THE OUTSIDE CRITICISM REALLY IS--BETTER ENVIRONMENTAL, SAFETY AND HEALTH PRECAUTIONS AT ALL EXISTING FEDERAL FACILITIES.

THE DETAILS OF OHIO'S CONSENT DECREE WITH THE DEPARTMENT OF ENERGY AND ITS CONTRACTOR AT THE FERNALD SITE ARE IMPORTANT TO THIS COMMITTEE AS IT CONSIDERS BUDGETARY AND POLICY QUESTIONS FOR FEDERAL FACILITIES.

AFTER FOURTEEN MONTHS OF NEGOTIATIONS, OHIO FILED SUIT AGAINST THE DEPARTMENT OF ENERGY AND ITS FORMER CONTRACTOR IN MARCH, 1986, FOR 27 COUNTS OF VIOLATING STATE HAZARDOUS WASTE AND WATER POLLUTION LAWS. A SECOND SUIT FILED IN MARCH, 1987, CITED THE

AGENCY AND ITS PRESENT CONTRACTOR FOR TWO SEPARATE AIR POLLUTION INCIDENTS INVOLVING THE RELEASE OF RADON GAS AND URANIUM HEXAFLUORIDE.

TWO CONSENT DECREES RESOLVING MOST OF THE ISSUES RAISED BY THE TWO ENFORCEMENT ACTIONS WERE SIGNED ON DECEMBER 2, 1988, BY JUDGE S. ARTHUR SPIEGEL OF THE FEDERAL DISTRICT COURT, SOUTHERN DISTRICT OF OHIO. THE FACILITY NOW OPERATES UNDER STRICT COURT ORDERS REQUIRING IT TO COMPLY WITH ALL STATE AND FEDERAL HAZARDOUS WASTE LAWS AND TO MEET THE PROPER GROUNDWATER, SURFACE WATER, AND AIR POLLUTION STANDARDS. IN ADDITION, THE STATE OF OHIO NOW HAS CLEAR AUTHORITY TO REGULATE THE TREATMENT AND DISPOSAL OF "MIXED WASTE," HAZARDOUS WASTE MIXED WITH RADIOACTIVE PARTICLES AT THIS FACILITY.

A MAJOR PROVISION OF ONE OF THE CONSENT DECREES MANDATES THAT THE DEPARTMENT OF ENERGY REIMBURSE OHIO ON AN ANNUAL BASIS FOR ITS RESPONSE COSTS FOR OVERSEEING SITE CLEAN UP. OHIO CAN NOW ACT AS A WATCHDOG AS THE AGENCY IMPLEMENTS THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY ORDERED BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY.

THE SPECIFIC REQUIREMENTS OF THE CONSENT DECREE ARE AS FOLLOWS:

1) THE DEPARTMENT OF ENERGY IS REQUIRED TO PAY THE STATE'S PAST AND FUTURE COSTS FOR STUDYING AND INVESTIGATING POLLUTION PROBLEMS AT THE SITE, AS WELL AS TO PAY FOR VIOLATING STATE LAWS. THE ORDERS ALSO PROVIDE FOR CIVIL PENALTIES, WHICH THE DEPARTMENT HAS APPEALED UNDER THE THEORY THAT SOVEREIGN IMMUNITY HAS NOT BEEN WAIVED UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT. LATER IN MY TESTIMONY I WILL DISCUSS THE WAIVER IN MORE DETAIL.

2) THE DEPARTMENT OF ENERGY IS ORDERED TO COMPLY WITH ALL FEDERAL AND STATE HAZARDOUS WASTE LAWS AND REGULATIONS. THIS ORDER ALSO EXTENDS TO HAZARDOUS WASTE MIXED WITH RADIOACTIVE PARTICLES, CREATING A NEW LEGAL PRECEDENT FOR THE DEPARTMENT OF ENERGY. ANY FUTURE VIOLATIONS OF THESE STATUTES COULD RESULT IN THE AGENCY BEING FOUND IN CONTEMPT OF COURT.

3) FEDERAL OFFICIALS ARE PROHIBITED FROM BRINGING ANY ADDITIONAL OFF-SITE HAZARDOUS WASTE STREAMS TO THE FERNALD FACILITY.

4) ALL ON-SITE HAZARDOUS WASTE STREAMS WILL BE INSPECTED AND NECESSARY PRECAUTIONARY STEPS WILL BE TAKEN TO PREVENT SPILLS. FACILITY OPERATORS WILL MAINTAIN AN INVENTORY OF ALL HAZARDOUS AND MIXED WASTE ON THE SITE, A LOG WHICH PROVIDES OHIO EPA WITH EASY ACCESS TO NEEDED INFORMATION.

5) THE DEPARTMENT OF ENERGY MUST COMPLETE WITHIN NINETY DAYS OF THE FILING OF THE DECREE A THOROUGH ANALYSIS OF ALL HAZARDOUS AND MIXED WASTE STREAMS PRODUCED OR RECEIVED AT THE SITE. THE TESTS WILL HELP DETERMINE WHAT OTHER CONTAINMENT STEPS ARE NECESSARY TO PREVENT FURTHER POLLUTION.

6) FEDERAL OFFICIALS HAVE 45 DAYS TO CORRECT DEFICIENCIES IN THEIR PROPOSED GROUNDWATER MONITORING PLAN. ONCE THE PLAN IS APPROVED BY OHIO EPA, THE DEPARTMENT OF ENERGY MUST COMMENCE TESTING.

7) DUE TO PAST TEARS IN THE LINER OF A WASTE PIT AT THE FACILITY, THE DEPARTMENT OF ENERGY IS PROHIBITED FROM USING THE PIT OR ADJACENT SUMP WITHOUT PRIOR STATE APPROVAL.

8) TO PREVENT FURTHER POLLUTION OF NEARBY PADDY'S RUN CREEK, THE DEPARTMENT OF ENERGY IS PROHIBITED FROM DISCHARGING ANY WATER FROM THREE WASTE PITS, A SURGE LAGOON, OR STORMWATER RETENTION BASIN DRAINS INTO PADDY'S RUN.

9) THE COAL STORAGE AREA ON-SITE MUST BE STUDIED TO PREVENT GROUNDWATER POLLUTION.

10) NECESSARY WATER POLLUTION EQUIPMENT AND COMPLIANCE WITH THOSE PERMITS IS REQUIRED.

11) A STORMWATER RETENTION BASIN HAS BEEN CONSTRUCTED TO PROTECT PADDY'S RUN CREEK FROM CONTAMINATION OF SOLIDS AND RADIOACTIVE MATERIALS.

12) THE DEPARTMENT OF ENERGY MUST MEET STRINGENT GUIDELINES CONCERNING THE OPERATION OF REACTOR VESSELS TO GUARD AGAINST MALFUNCTIONS AND ACCIDENTAL RELEASES OF RADIOACTIVE AIR CONTAMINANTS. PROPER ALARM SYSTEMS, REGULAR INSPECTIONS, SAFER OPERATING PROCEDURES AND IMMEDIATE NOTIFICATION OF STATE OFFICIALS IN THE EVENT OF RELEASE ARE ALL REQUIRED.

13) FURTHER VENTING OF RADON GAS IS EXPRESSLY PROHIBITED AND NO PHYSICAL CHANGES WHICH MAY INCREASE AIR POLLUTION FROM THE SILOS CAN BE MADE BY FEDERAL OFFICIALS OR PLANT OPERATORS WITHOUT PRIOR CLEARANCE FROM OHIO EPA.

14) THE DEPARTMENT OF ENERGY MUST ENSURE THAT ANY AND ALL CONTRACTORS OPERATING THE FERNALD FACILITY COMPLY WITH THE TERMS OF THE CONSENT JUDGMENT.

15) THE JUDGMENT PROVIDES FOR A DISPUTE RESOLUTION PROCESS, SHOULD DISAGREEMENTS ARISE CONCERNING THE METHODS USED TO ACCOMPLISH THE CLEAN-UP AND COMPLIANCE GOALS. THIS PROCESS WILL GUARANTEE THAT DEPARTMENT OF ENERGY OFFICIALS WILL HAVE A CONSISTENT AND MEANINGFUL DIALOGUE WITH THE STATE ABOUT PROBLEMS ARISING DURING THE STUDY AND CLEAN-UP. HOWEVER, IT SHOULD BE NOTED THE JUDGMENT IS ENFORCEABLE IN COURT, AND DISPUTE RESOLUTION WILL NOT ALLOW FOR CIRCUMVENTION OF SPECIFIC GOALS, BUT SIMPLY ARBITRATION OVER APPROPRIATE PROCEDURES.

THESE CONSENT DECREES, UNLIKE A FEDERAL FACILITIES COMPLIANCE AGREEMENT, ARE JUDICIALLY ENFORCEABLE AND PROVIDE FOR IMMEDIATE SANCTIONS IF VIOLATED. I WOULD NOT HAVE SIGNED A DOCUMENT WHICH DID NOT PROVIDE FOR THIS TYPE OF ASSURANCE OF THE AGENCY'S COMPLIANCE WITH ITS AGREEMENT.

THE DEPARTMENT OF ENERGY IS REQUIRED TO PAY \$1,068,070 AS A RESULT OF THESE LAWSUITS. A PORTION OF THAT AMOUNT, WHICH IS SPECIFIED AS CIVIL PENALTIES, IS UNDER APPEAL, CONSISTENT WITH THE PAST ADMINISTRATION'S INSISTENCE THAT THE FEDERAL GOVERNMENT CANNOT BE FORCED TO PAY CIVIL PENALTIES DUE TO SOVEREIGN IMMUNITY.

BUILDING NEW CAMOUFLAGE TECHNIQUES OR FORTIFYING EXISTING FACADES DESIGNED TO LESSEN THE PUBLIC'S CALL FOR ACCOUNTABILITY WILL NOT ASSIST THE DEPARTMENT OF ENERGY IN MEETING ITS NEW CHALLENGES. THEREFORE, I AGAIN URGE THIS COMMITTEE TO CLARIFY EXISTING LAW AND REMOVE THE SPECTOR OF SOVEREIGN IMMUNITY USED BY THE FEDERAL GOVERNMENT TO PREVENT ACCOUNTABILITY.

THE NEED TO SUBJECT FEDERAL FACILITIES TO ALL REQUIREMENTS OF STATE AND FEDERAL ENVIRONMENTAL LAWS INCLUDING THE ASSESSMENT OF CIVIL PENALTIES, WHICH MAY BE APPLIED AGAINST ANY PRIVATE VIOLATOR, CONTINUES TO BE ESSENTIAL. UNLESS FEDERAL FACILITIES KNOW THEY WILL BE PUNISHED FOR VIOLATING THE LAW, THEY WILL HAVE LITTLE INCENTIVE FOR COMPLIANCE. THIS ISSUE REMAINS UNRESOLVED EVEN IN THE FERNALD CASE. ALTHOUGH JUDGE SPIEGEL OF THE DISTRICT COURT IN CINCINNATI RULED ON MARCH 18 OF LAST YEAR THAT THE DEPARTMENT OF ENERGY COULD BE SUBJECT TO CIVIL PENALTIES UNDER BOTH STATE AND FEDERAL LAW, THE DEPARTMENT OF JUSTICE IS APPEALING THIS DECISION.

THE JUSTICE DEPARTMENT HAS CONDUCTED A NATIONWIDE CAMPAIGN TO PREVENT THE ASSESSMENT OF CIVIL PENALTIES AGAINST FEDERAL FACILITIES. THEIR CONDUCT CAUSES ME TO AGREE WITH REMARKS MADE BY SENATOR ROBERT STAFFORD DURING THE SUPERFUND REAUTHORIZATION DEBATES IN 1985. HE SAID, "BUT NO LOOPHOLE, IT SEEMS, IS TOO SMALL TO BE FOUND BY THE FEDERAL GOVERNMENT."

DESPITE CONGRESS' WAIVER OF SOVEREIGN IMMUNITY IN THE SOLID WASTE DISPOSAL ACT AND THE CLEAN WATER ACT, THE JUSTICE DEPARTMENT CONTINUES TO FILE VOLUMINOUS BRIEFS FILLED WITH TECHNICAL ARGUMENTS WHICH STRAIN THE VERY WORDS USED BY CONGRESS.

THIS IS THE SAME JUSTICE DEPARTMENT WHICH SEEKS TO IMPOSE CIVIL PENALTIES ON FINANCIALLY STRAPPED MUNICIPALITIES FOR FAILING TO MEET THE REQUIREMENTS OF THE FEDERAL CLEAN WATER ACT. THESE CONFLICTING POSTURES CONSTITUTE AN ENORMOUS DOUBLE STANDARD.

THE DEPARTMENT OF JUSTICE ARGUES THAT:

- 1) THE TERM "REQUIREMENTS" AS USED IN SECTION 6001 ONLY INCLUDES SANCTIONS TO ENFORCE INJUNCTIVE RELIEF (PUNISHMENT FOR CONTEMPT), NOT CIVIL PENALTIES.
- 2) THE TERM "SANCTIONS" DOES NOT INCLUDE CIVIL PENALTIES; AND,
- 3) THE CITIZEN SUIT PROVISION, SECTION 7002, AUTHORIZES THE COURTS TO APPLY ANY APPROPRIATE PENALTIES UNDER SECTION 3308(G); SINCE SECTION 3008 (G) APPLIES ONLY TO "PERSONS" AND "PERSONS" AS DEFINED BY SECTION 1004 DOES NOT INCLUDE THE FEDERAL GOVERNMENT, PENALTIES MAY NOT BE ASSESSED PURSUANT TO A CITIZENS' SUIT.

THESE ARGUMENTS HAVE BEEN SUCCESSFUL IN FOUR OTHER CASES IN WHICH CIVIL PENALTY CLAIMS WERE DISMISSED. THESE CASES ARE: MEYER V. COAST GUARD, 644 F. SUPP. 221 (E.D.N.C. 1986); MESS V. WEINBERGER, 25 ERC (BNA) 1480 (E.D. CAL. 1986); UNITED STATES V. STATE OF WASHINGTON, NO. C087-291-AAM (E.D. WASH., JAN. 22, 1988); PEOPLE OF THE STATE OF CALIFORNIA V. UNITED STATES, NO. S-86-190 EJG (E.D. CALIF., APRIL 18, 1988). THE ONLY OTHER DECISION, BESIDES OUR OWN, WHICH HAS GONE THE OPPOSITE WAY IS THE CASE OF MAINE V. DEPARTMENT OF NAVY, NO. 86-0211 P (D. ME., NOV. 23, 1988).

IN ADDITION TO OPPOSING THE ASSESSMENT OF CIVIL PENALTIES AGAINST FEDERAL FACILITIES, THE JUSTICE DEPARTMENT HAS TAKEN SIMILAR POSITIONS ON OTHER HAZARDOUS WASTE ENFORCEMENT MECHANISMS. IN THE CASE OF CALIFORNIA V. WALTERS, 751 F. 2D 977 (9TH CIR. 1984), THE DEPARTMENT CONVINCED THE COURT OF APPEALS FOR THE NINTH CIRCUIT THAT THE SOLID WASTE DISPOSAL ACT DOES NOT WAIVE THE SOVEREIGN IMMUNITY OF FEDERAL AGENCIES AGAINST CRIMINAL SANCTIONS.

DUE TO THE ABSENCE OF FEDERAL ENFORCEMENT OF ENVIRONMENTAL LAWS AGAINST FEDERAL AGENCIES, THE ROLE OF THE STATES AND THEIR ATTORNEYS GENERAL IN THE ENFORCEMENT OF THESE LAWS AGAINST RECALCITRANT FEDERAL AGENCIES HAS BECOME MORE AND MORE IMPORTANT. THE JUSTICE DEPARTMENT'S EFFORTS TO AVOID THE IMPOSITION OF SANCTIONS AGAINST THESE FEDERAL AGENCIES GREATLY UNDERCUTS THE EFFECTIVENESS OF ENFORCEMENT EFFORTS BY THE STATES.

IN CONCLUSION, CITIZENS, STATE OFFICIALS AND MEMBERS OF CONGRESS HAVE ACHIEVED REMARKABLE PROGRESS. THERE IS STILL, HOWEVER, MUCH TO BE DONE. STATES DO NOT HAVE THE AUTHORITY TO REGULATE NUCLEAR WASTE, THE WORST ENVIRONMENTAL PROBLEM AT THE FERNALD SITE AND AT OTHER FACILITIES. ALTHOUGH OHIO DID GAIN AUTHORITY OVER MIXED WASTE AT FERNALD AND PIKETON, IT SEEMS UNLIKELY THAT THE DEPARTMENT OF ENERGY WILL ACQUIESCE THEIR CONTROL OVER THIS TYPE OF WASTE IN EVERY INSTANCE. A CLEAR WAIVER OF SOVEREIGN IMMUNITY IS NEEDED TO ASSESS CIVIL PENALTIES AND GAIN OVERSIGHT CONTROL OVER NUCLEAR WASTE GENERATED BY THE DEPARTMENT OF ENERGY.

CLARIFICATION OF CONTAMINATION AND DOLLARS NEEDED TO ABATE THE PROBLEMS CAUSED BY THE POLLUTION IS ALSO NECESSARY. CLEANUP WILL TAKE MANY YEARS, THEREFORE A LONG-TERM FUNDING MECHANISM IS REQUIRED. AS SHOWN BY THE PRELIMINARY REPORTS FROM THE DEPARTMENT OF ENERGY, HOWEVER, FUNDING SHOULD NOT BE PRESENTED AS A BLANK CHECK. PROPER OVERSIGHT OF EXPENDITURES IS IMPORTANT TO ENSURE THAT CLEANUP IS COMPLETE.

I COMMEND THIS COMMITTEE'S EFFORTS IN REVIEWING THIS GRAVE PROBLEM, AND URGE IT TO RECOMMEND THAT THESE STEPS BE TAKEN TO ABATE THE CONTAMINATION CAUSED BY THE DEPARTMENT OF ENERGY IN OHIO AND OTHER STATES. WE NEED NO LONGER QUESTION WHETHER THE FEDERAL GOVERNMENT HAS CAUSED DAMAGE TO OUR NATURAL RESOURCES, WE NEED ONLY TO BEGIN ENSURING THAT THE DAMAGE IS CORRECTED.

STATEMENT OF
J. WINSTON PORTER
ASSISTANT ADMINISTRATOR
FOR SOLID WASTE AND EMERGENCY RESPONSE
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
COMMITTEE ON GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

January 26, 1989

Good morning, Mr. Chairman and Members of the Committee. Thank you for the opportunity to be here today to discuss the Environmental Protection Agency's implementation of the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) at the Department of Energy (DOE) nuclear weapons production complex. With me today are Christopher Grundler, Director of the Federal Facilities Hazardous Waste Compliance Office; Lisa K. Friedman, Associate General Counsel; and Richard E. Sanderson, Director of the Office of Federal Activities.

Today I will provide an overview of EPA's activities with regard to both RCRA and CERCLA and describe some of the Agency's future goals for Federal facility compliance. An area I will particularly emphasize are the interagency agreements (IAGs) which EPA has been developing with the states and DOE at specific DOE facilities. Then I will respond to the issues raised in your letter of invitation.

I. OVERVIEW

The U.S. Environmental Protection Agency (EPA) believes that Federal agencies have an obligation to comply with all Federal environmental statutes in the same manner and degree as other regulated entities. It is imperative that every effort be made to ensure that Federal facilities achieve and maintain high rates of compliance with such environmental requirements. And it is important to EPA's compliance and enforcement efforts at non-Federal entities that EPA demonstrates its resolve to enforce hazardous waste requirements at Federal facilities with the same vigor it uses at private facilities.

Because of the nature of the problems, a major focus in EPA over the past two years has been compliance by DOE with the RCRA and Superfund statutes. This is particularly true of the nuclear weapons complex, which is made up of sixteen major facilities. Essentially all of these facilities have, or will have compliance or cleanup issues dealing with solid, hazardous or radioactive wastes. Indeed, the majority of environmental problems and associated future expenditures at DOE's nuclear weapons facilities are related to solid, hazardous or radioactive waste issues.

In the next section of my testimony I will focus in some detail on your question related to "issues surrounding recent consent decrees between DOE and states." Following this, I will respond to the issues raised in your letter of invitation.

II. INTERAGENCY AGREEMENTS

Section 120 of the Superfund law requires that Federal agencies which have Superfund NPL sites enter into interagency agreements (IAGs) with EPA to effect the cleanup of those sites. In addition, Federal facilities with RCRA permits must conduct corrective actions for on-site solid waste management units which have releases to the environment. Most of the facilities making up the DOE's nuclear weapons complex are under the jurisdiction of both RCRA and Superfund. Also, a number of state environmental statutes or regulations may be applicable to DOE facilities. Depending on site-specific circumstances at each of these facilities, cleanup can be required through either a RCRA permit (with a corrective action plan), a RCRA corrective action order addressing hazardous waste releases, or under Superfund as specified through a section 120 IAG.

The general approach EPA is taking for cleanup of the major DOE facilities is the development, in conjunction with the appropriate states, of three-party (EPA, DOE, State) Superfund IAGs at each facility. This approach has the following advantages:

- o RCRA, Superfund, and other requirements can be addressed in one consistent document, leading to an overall compliance and cleanup program.
- o The full range of hazardous substances, both chemical and radioactive, can be dealt with in one document.

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- o The document, once agreed to by all parties, is legally binding and enforceable in Federal District Court by states and citizens.

In order to facilitate the development of three-party IAGs, the EPA, DOE, and the Department of Defense (DoD) developed model language for key sections of these IAGs. Individual state concerns are then negotiated on a site-specific basis. The EPA/DOE/DOD model language resolved significant policy issues including enforceability, resolution of disputes, stipulated penalties, review process for RI/FS, remedial design and remedial action (RD/RA) documents, funding and jurisdiction. Key features of the model agreement include the following:

- o A strong enforceability provision for State and citizen enforcement of the agreement.
- o A dispute resolution process which provides a streamlined mechanism to resolve disputes, with the EPA Administrator making the final decision.
- o EPA assessment of stipulated penalties in the event of a failure to comply with a final resolution of dispute, failure to meet certain critical deadlines, or failure to fulfill a term or condition of the agreement associated with a remedial action.
- o A streamlined and well defined relationship between EPA, and DOE or DoD for the remedial investigation/feasibility study, remedy selection, and remedy implementation.

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- o A funding clause that describes actions DOE or DoD will take to meet their obligations under the agreement.
- o A mechanism by which the Parties can develop a comprehensive plan for action which satisfies the requirements of both RCRA and CERCLA and addresses overlap of authorities and minimizes duplication of efforts.

The model language is to be utilized by EPA and DOE, or DoD for National Priorities List sites where CERCLA is tapped as a lead cleanup authority. The language sets forth the relative roles and responsibilities of the Federal agencies with respect to one another, and with respect to the cleanup of CERCLA sites.

Although the model language does not specifically deal with the state's role in the agreement, EPA recognizes the importance of state involvement at DOE and DoD Superfund sites in site-specific negotiations. The state's interests, and references within the agreement to these interests, are being built into the site-specific agreements within the context of these negotiations.

Since development of the model agreement language, the EPA and the DOE and the states have been very active in development of specific agreements at nuclear weapons complex facilities. What follows is a brief summary of ongoing actions at the following major DOE facilities. Each agreement, consent order,

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or permit discussed below is a legally binding document enforceable in Federal District Court by the State or a citizen.

- o Lawrence Livermore National Laboratory - Superfund IAG signed by EPA, DOE, and the State of California on November 2, 1988. Comprehensive agreement covering all phases of cleanup, with work to be overseen by EPA and the State. Includes both CERCLA and RCRA obligations.
- o Monticello Properties - Superfund IAG signed by EPA, DOE, and the State of Utah on December 16, 1988. Comprehensive agreement covering all phases of cleanup, with work to be overseen by EPA and the State.
- o Idaho National Engineering Laboratory - RCRA 3008(h) Consent Order for corrective action signed by EPA and DOE on July 10, 1987. Consent Order covers all hazardous-waste and hazardous constituent releases at the facility. The facility is currently being evaluated for the Superfund National Priorities List (NPL) and is likely to be proposed in the near future. Superfund IAG, covering radioactive releases at the facility, scheduled for completion this year.
- o Feed Materials Production Center (Fernald) - Federal Facility Compliance Agreement (FFCA) signed by EPA and DOE on July 18, 1986. Agreement modified on June 30,

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1988 to include an enforceability clause. Agreement covers both Superfund and RCRA, as well as other environmental laws. Consent Decree filed on December 2, 1988, resolving litigation between Ohio and DOE, requires DOE to continue to comply with the FFCA between EPA and DOE. EPA anticipates proposing this facility for the Superfund NPL in the near future.

- o Hanford - Ongoing negotiations between EPA, DOE, and the State of Washington on a comprehensive cleanup agreement at this proposed NPL site. A great deal of progress has been made in developing an agreement to address this very complex site. The agreement under negotiation covers Superfund cleanup, RCRA permitting, and RCRA closures.
- o Mound Plant - Ongoing negotiations between EPA, DOE, and the State of Ohio on a Superfund IAG. EPA anticipates proposing the facility for the Superfund NPL in the near future.
- o Rocky Flats - Federal Facility Compliance Agreement between EPA, DOE and the state signed on July 31, 1986, covering both RCRA and CERCLA obligations. The state plans to issue a RCRA permit this Spring which will cover a portion of the facility. The permit will contain closure and corrective action requirements at the RCRA units. In addition, EPA intends to negotiate a comprehensive Superfund IAG with DOE and the State

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later this year to cover radioactive releases at the facility.

- o Oak Ridge - A final RCRA permit is in place which includes corrective action provisions covering all hazardous waste releases at the facility. In addition, EPA is negotiating a Superfund IAG with DOE and the State to cover any radioactive releases at the facility. EPA anticipates proposing facility for the Superfund NPL in the near future.
- o Savannah River Plant - EPA has issued a final RCRA permit, which includes corrective action provisions covering all hazardous waste releases at the facility. In addition, EPA is negotiating a Superfund IAG with DOE and the State to cover any radioactive releases at the facility. EPA anticipates proposing the facility for the Superfund NPL in the near future.
- o Pantex - EPA and DOE are negotiating an agreement which will require DOE to investigate all hazardous waste releases at the facility.
- o Kansas City Plant - This DOE Defense Facility does not handle nuclear material and has not scored high enough for inclusion on the NPL. Instead, the cleanup will primarily be regulated under RCRA. EPA is developing a RCRA 3008(h) corrective action order to address hazardous waste releases at the facility. The order will cover closure of lagoons as well as the operation

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of a ground water treatment plant. Discharges from the plant, which DOE has operated for some time, are regulated by a Clean Water Act permit.

- o Los Alamos National Lab - This is a non-NPL facility and the cleanup will be regulated under the RCRA program. Corrective action to remediate releases of hazardous waste at the facility will be addressed through the RCRA permit.
- o Sandia National Lab - This is a non-NPL facility and the cleanup will be regulated under the RCRA program. Corrective action to remediate releases of hazardous waste at the facility will be addressed through the RCRA permit.

III. COMMENTS ON DOE PROGRAM

In the letter of invitation EPA's comments were sought on three other issues. While we have not had an opportunity to fully review these matters, preliminary EPA responses are provided below.

- 1) Your view of the Administration's budget request for Fiscal Year 1990 for cleanup and modernization of the weapons production complex.

EPA reviews other agencies' requests in the context of OMB circular A-106, which requires each agency to summarize environmental projects that the Federal agency needs to accomplish in order to stay in compliance with the various

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environmental statutes. These projects make up what is known as the Federal agency pollution abatement plan for each agency. This system does not capture such DOE funds as routine O&M expenditures, some cleanup of previously-owned facilities, modernization, and mill-tailings cleanup, so total budget amounts are not reflected. In addition, this document is prepared and reviewed by EPA before the agency's request is submitted to OMB and does not fully reflect the final funding level in the President's budget.

When EPA evaluates the agency plans, each media program looks at each plan from both the standpoint of its overall adequacy and also what needed additions or changes might be suggested to an agency to bring their facilities into environmental compliance in a more timely manner. For example, during the FY 1990 review of the DOE A-106 plan, EPA suggested almost seventy changes or additions to the plan that were incorporated in one way or another into the final DOE pollution abatement and control plan that was finally submitted to OMB. However, it is clear that the DOE request, which is twice the FY 89 funding level, reflects the current study phase DOE is in, and is an initial down payment on the significant cleanup needs faced by the Department.

- 2) The so-called "December Report" on cleanup, and its integration into the 2010 Study and the departments FY 90 budget.

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The "December Report" is a Department-wide assessment of environment, safety, and health needs for all environmental media. Although EPA has not had an opportunity to fully review the report, I think the Department deserves credit for developing such a report, which should be the first step in planning for the cleanup and compliance needs of the DOE complex. The "December Report," along with the report published in September, were used in part to develop the "2010 study," which is DOE's plan for modernizing the nuclear weapons complex, as well as meeting the environment, safety, and health needs through the 2010 planning horizon. As I mentioned above the FY 1990 budget request by DOE, twice the FY 89 funding level, reflects the initial study phase and is an initial downpayment by the government on the compliance and cleanup funding needs facing the Department.

- 3) The department's prioritization report, including its methodology and relationship to environmental compliance schedules.

The Department's prioritization report is a product of the DOE-wide Environmental Survey program launched several years ago. Although EPA has not been involved in developing the report, DOE coordinated their survey effort with EPA, and EPA staff received several briefings on DOE's prioritization methodology. Prior to conducting an environmental survey at a facility, DOE met with EPA and the State to get our particular concerns at the facility and our comments on the survey plan.

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In addition, DOE has been sharing the preliminary findings of the Survey with the Agency.

EPA believes it is important, indeed necessary, for Federal agencies to have some sort of internal priority-setting mechanism. However, any internal priority-setting system must take into account environmental compliance schedules, which are often dictated by statute. DOE assures me that the Department-wide prioritization process includes compliance schedules in determining cleanup priorities, and that DOE expects to meet its obligations under existing and future agreements it signs with EPA and the States.

4) Current issues surrounding recent Consent Decrees between DOE and the States.

I've addressed much of this issue by my earlier description of the status of ongoing administrative actions being taken at major facilities by EPA and the states. In general, EPA prefers to use the administrative process to resolve compliance and cleanup issues. As I have discussed above, the administrative process -- whether it results in a RCRA corrective action order, a permit, or a Superfund IAG -- produces a legally binding document, enforceable in Federal District Court. These are as fully enforceable as consent decrees. Furthermore, the administrative process is less time-consuming, involves fewer people and organizations and produces agreements much more efficiently than the civil judicial process. The sooner we get these agreements in place, the sooner we get down the road of

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environmental compliance and cleanup of these facilities. Consent Decrees are generally required, as was the case at Fernald, to settle litigation. But my hope would be that we can settle these matters between EPA, DOE, and the states without resorting to litigation.

IV. CONCLUSION

In closing, I would like to reiterate that EPA is very serious in its efforts to ensure compliance by Federal of facilities, and we will take all necessary actions, including enforcement, if required, to improve the environmental status of facilities of the Federal government. Federal facilities have made progress in increasing the effectiveness of their environmental management programs, but further progress is needed if Federal facilities are to meet their obligations to comply with all of the environmental laws.

I do believe that we are making significant achievements in reaching agreements with DOE for RCRA and Superfund compliance and future cleanups. Obviously, some large and potentially difficult challenges remain. To overcome them and maintain the momentum we have set into place recently will require additional effort by all parties. To succeed, I believe we have to particularly focus on additional interagency agreements, with the states as partners.

This concludes my prepared statement, Mr. Chairman. My colleagues and I will be happy to answer any questions you may have.

RESPONSE TO FOLLOW-UP QUESTIONS FROM THE COMMITTEE ON GOVERNMENTAL AFFAIRS HEARINGS ON CLEANUP AND MODERNIZATION OF THE DOE NUCLEAR WEAPONS COMPLEX

Question #1: Please indicate which of the DOE's weapons plant sites are now in compliance with Federal environmental law. Also, please indicate which specific facilities are out of compliance and the law(s) that they are violating.

Answer: We have reviewed the most recent data (3/89) entered into each of EPA's major program data information systems for the DOE weapons plant facilities identified in Enclosure 1. The information systems reviewed were the Compliance Data System (CDS) for air violations, the Permit Compliance System (PCS) for water (NPDES) violations and the Hazardous Waste Data Management System (HWDMS) for RCRA violations. In the air program, two of the listed DOE facilities were found to be in violation of the Clean Air Act--the Feed Material and Production Center, Fernald, Ohio and the Pinellas Plant, Florida. In the water (NPDES) program, the Fernald facility once again was in violation of the Clean Water Act, as well as the Los Alamos National Laboratory in New Mexico. In the RCRA program, the following facilities are currently not in compliance: US DOE Paducah Gaseous Diffusion Plant, Kentucky, US DOE K-25 Site, Tennessee, US DOE Y-12 Plant, Tennessee, US DOE Mound Facility, Ohio, US DOE Los Alamos, New Mexico, US DOE Sandia, New Mexico, US DOE Kansas City Plant, Missouri, US DOE Rocky Flats, Colorado, US DOE Lawrence Livermore National Labs, California, US DOE Hanford, Washington and the Feed Materials Production Center, Ohio.

Question #2: Please provide in writing the DOE weapons facilities that have exemptions from Federal and State environmental statutes and which specific statutes are waived per site and why the facilities are exempt.

Answer: The Agency is not aware that there are any DOE facilities that are specifically exempt from any Federal or State statutes.

Question #3: Given the money requested in the budget for compliance and cleanup, which seems to be about \$401 million, how many more facilities will come into compliance with applicable Federal and State laws?

Answer: It is the Agency's understanding that the \$401 million is for environmental restoration activities,

which includes an indeterminate number of compliance related projects. In addition, there are other restoration, upgrading or construction projects outside of the environmental budget which may be compliance related. (Restoration activities entail restoration of a facility to a position where it no longer constitutes a threat to public health and the environment.) However, it is unclear to EPA how much DOE is spending on compliance activities, that is, measures to bring DOE into compliance with the day-to-day requirements of environmental law. It is therefore difficult to speculate how many more facilities will achieve compliance with environmental laws as a direct result of the appropriated money.

Question #4: The A-106 Pollution Abatement plans system that EPA is supposed to use to track Federal compliance and propose project costs for the budget does not seem to work. Your testimony indicates that the system does not reflect total budget amounts and needs to be looked at. How will EPA revamp the A-106 process to make it more efficiently track compliance and clearly parallel the budget process?

Answer: EPA has increased the full-time staff for A-106 pollution abatement and control planning and review. A major effort is presently underway to improve the system and make it more responsive and efficient. OMB Circular A-106 governs what is included in the pollution abatement planning database and it indicates that such items as research and development costs, salaries of agency environmental personnel and ongoing or routine O&M costs will not be reported by the Federal agencies as part of their pollution abatement plans. However, in the 1988 OMB Circular A-11, "Preparation and Submission of Budget Estimates," transmitted to all Federal agencies, OMB directs that "estimates for design and construction of Federal facilities or remedial environmental projects will be submitted only after consultation with the Environmental Protection Agency (EPA) on OMB Circular No. A-106 plans." After all Federal agencies fully implement this directive, it is expected that information contained in the A-106 system and the information contained in the individual agency budget submissions will track more closely.

Question #5: Please explain the EPA claim that IAG's or compliance agreements are legally enforceable and describe the process by which a complaint might be pursued to enforce an IAG.

Answer: EPA believes that Interagency Agreements

(IAGs) are fully binding and enforceable pursuant to the terms of the agreement themselves, and pursuant to CERCLA sections 120 and 310. Federal Facility Compliance Agreements (FFCAs), generally entered into in response to RCRA violations, are also binding and enforceable, pursuant to the terms of the agreement themselves, and pursuant to RCRA section 7002. EPA's position on the enforceability of these agreements is in accord with Department of Justice statements (see Enclosure 2).

To enforce an IAG or FFCA any person, including a citizen or the State, could file suit in the U.S. District Court in which the facility is situated. Both IAGs and FFCAs contain enforceability language which provide for enforceability by any person, easing access to judicial enforcement of these documents.

Question #6: Please provide the Committee with an example of a DOE/EPA signed IAG that contains provisions that allows violators of the agreement to be monetarily penalized automatically upon not meeting the agreement's requirements.

Answer: The Lawrence Livermore National Laboratory IAG (Enclosure 3) contains model enforceability and stipulated penalty language which is being used for all future EPA/DOE IAGs.

Question #7: Does the EPA intend to enter into an IAG at every DOE site? When does EPA expect to complete those IAGs? Please provide the Committee with a copy of the boilerplate IAG language that the Agency has developed with DOD and DOE.

Answer: EPA intends to enter into an IAG at every DOE facility that contains an NPL site. According to Section 120 of CERCLA, Interagency Agreements (IAG) are required at federally-owned facilities listed on the NPL. In the interest of time, however, the Agency is beginning the negotiations of these comprehensive agreements at federal facilities containing proposed NPL sites. This approach stems from the inherent complexity of these facilities and EPA's belief that these proposed sites will eventually be listed.

It is difficult to predict the completion date for these IAG negotiations due to the complex nature of each DOE facility. However, for planning purposes, EPA intends to enter into IAGs with the following DOE facilities in FY89: Lawrence Livermore National Laboratory (completed), DOE Savannah River Plant, DOE Oak Ridge, Monticello Properties (completed), Hanford (draft

out for public comment), Wayne Interim Storage Site, Weldon Springs Quarry, and Idaho National Engineering Laboratory. In FY 90, the Agency intends to enter into IAGs with the following DOE facilities: Mound Laboratory, Rocky Flats Plant, Lawrence Livermore National Laboratory Site 300, and Brookhaven National Laboratory. These agreements are comprehensive and will operate over many years. As a result, they take some time to develop. The amount of time required for development is further affected by the vastness of the facility's size (58,000 acres at Oak Ridge), the technical considerations, and the variety of environmental problems. Identifying what is the scope of an IAG (e.g. areas of contamination, types of contamination, and environmental laws concerned) is an elaborate, technically complex process. At DOE, Oak Ridge, for example, scoping the Agreement has required months of technical discussions. Enclosure 4 includes the boilerplate IAG language that EPA developed with the Departments of Energy and Defense.

Question # 8: What mechanisms will speed the compliance agreement process along and make it more satisfactory to the States? What does EPA perceive as the legal and political obstacles to a compliance agreement process that will provide adequate protection for the States, the Federal Treasury, and accelerated clean-up of the polluted sites?

Answer: The Agency is currently developing a Negotiations Policy which establishes deadlines for negotiating compliance agreements and Interagency Agreements (IAGs). EPA anticipates that this will speed the negotiating process. States should find the establishment of negotiating deadlines more satisfactory because these deadlines will minimize the lengthy delays that are being experienced at present with some Federal facilities. The primary legal and political obstacle to achieving three-party agreements is that environmental statutes often give the state, EPA, and the Federal facility overlapping decision-making authority. Some of these jurisdictional authorities cannot be waived. For example, the Administrator of EPA has the final decision-making authority for the remedy at NPL sites. In contrast, authorized states may have final regulatory authority at certain RCRA sites. Oftentimes, these sites overlap. Clearly, political and legal questions arise which require an understanding of each party's concerns and institutional limitations. EPA believes that such issues can be resolved in such a manner that will meet all parties concerns, and, in fact, nine IAGs have been entered thus far with Federal facilities and states. A

tenth IAG addressing environmental problems at Rocky Mountain Arsenal involves EPA and the federal facility without the state of Colorado.

As to protection of the Federal Treasury, the model language negotiated with the Departments of Energy and Defense contains a funding clause. This clause references the requirement that the Federal facility include in its annual report to Congress the specific cost estimates and budgetary proposals associated with carrying out the IAG. The funding clause also acknowledges the constraints of the Anti-Deficiency Act.

As for accelerated cleanup, the Agency in conjunction with the state and the federal facility attempt to identify interim actions to address immediate or urgent problems as the long-term studies are carried out. We have done this at numerous facilities. For example, at the Idaho National Engineering Laboratory due to contamination in the drinking water well in excess of that allowed by the Safe Drinking Water Act, the well was shut down. DOE agreed to provide an alternate water supply and developed a treatment system to treat the drinking water to non-detectable levels of contamination. Meanwhile, the long-term investigation for the final cleanup is ongoing. Another illustration of this approach is evident at Fernald. Because of concern over the off-site contamination, DOE agreed to collect contaminated groundwater that is contributing to the off-site contamination plume.

Question #9: What system does the EPA have in place to inform the public and Congress about the status of compliance problems and negotiations at the weapons complex besides the A-106 system?

Answer: EPA has several mechanisms available to it to inform the public and Congress about the status of compliance problems and negotiations at DOE weapons facilities. Under the Resource Conservation and Recovery Act, the Agency has established the Hazardous Waste Data Management Tracking System. It tracks when notices of noncompliance are issued, compliance deadlines, and whether those deadlines are met. Information compiled pursuant to this system is available to the public. CERCLA utilizes a similar tracking system called CERCLIS. CERCLIS tracks the start dates and progress of remedial investigations and feasibility studies, cleanup decisions, and IAGs at Federal facilities.

Moreover, EPA has established the Federal Facilities Hazardous Waste Compliance Office which

functions as a focal point within EPA for responding to concerns regarding hazardous waste cleanup and compliance problems at DOE facilities. In addition, EPA has an Office of Federal Activities which serves as the principal liaison office between EPA and other Federal agencies for agency-wide programs. Also, CERCLA Section 120(c) requires EPA to set up the Federal Agency Hazardous Waste Compliance Docket which is available for public inspection. This Docket contains information, or summaries of information, submitted to EPA pursuant to sections 3005, 3010, and 3016 of the Solid Waste Disposal Act, and section 103 of CERCLA. Finally, active community relations personnel in each Region respond to public inquiries.

Question #10: What is EPA's specific policy to enable the production and utilization facilities in the weapons program to reach compliance agreements with States and EPA with respect to RCRA, Superfund and other environmental statutes?

Answer: As mandated by CERCLA section 120, and as described in our January 25, 1988 Federal Facilities enforcement policy, EPA will enter into IAGs at all Federal facilities on the NPL. These IAGs will generally be comprehensive three party agreements and will cover all releases subject to CERCLA or RCRA. If a facility is not on the NPL, but is subject to RCRA, then corrective action requirements will be established at the time of the RCRA permit issuance or through the issuance of corrective action orders under RCRA Section 3008(h).

Other RCRA compliance documents, such as Federal Facility Compliance Agreements, as well as compliance agreements under other environmental statutes, are only developed at the time of a violation, and if EPA has the regulatory lead for the enforcement action. Under RCRA, state regulatory agencies generally have the lead responsibility to take enforcement action for violations. In these actions, states issue orders or file civil actions to enforce RCRA requirements.

Question #11: The Savannah River Plant complex had 11 of the 18 instances of notices of violation in the most recent A-106 reports. According to your memorandum of March 24, 1988 to the EPA Regional Administrators, after these notices have been delivered, negotiations on a Federal Facility Compliance Agreement should be completed within 120 days. Please describe the process that has occurred at SRP since then. What follow-up successful and unsuccessful enforcement actions has the EPA taken at SRP and at other plants?

Answer: In general, violations discovered in EPA's annual inspection are usually referred to the state if the state is authorized to operate the RCRA program. South Carolina is authorized and, through the South Carolina Department of Health and Environmental Control, it has handled all violations except one Loss of Interim Status (LOIS) violation which resulted in an EPA Notice of Violation and a Federal Facilities Compliance Agreement (FFCA). This took about ninety days to negotiate. All known violations of Savannah River Plant have been addressed.

Question #12: Please provide an accounting of the resources, monetary, personnel, etc., that EPA devotes to cleaning up and bringing into compliance the DOE weapons complex sites. As a result of this commitment, can EPA project a time when these facilities should come into compliance and be cleaned up?

Answer: In FY89, EPA dedicated 44.1 Full Time Equivalent (FTE) and \$5.4 million to the management of RCRA and CERCLA issues at all Federal facilities. These resources were not separated by agency or type of facility. In FY90, these amounts will increase to 122.7 FTE and \$7.795 million.

Since we are not closely involved in the development of DOE's budget, and until DOE completes its own long term planning, through such efforts as the recently discussed five year plan, we cannot project when DOE will be able to clean up its facilities. EPA's emphasis will continue to be on obtaining enforceable schedules for both RCRA compliance and superfund cleanup through negotiation of FFCAs and IAGs.

Question #13: Have standards or guidelines been established for the cleanup of DOE weapons complex sites? If they have, please provide them for the Committee and if possible, the comments by other federal agencies on those standards or guidelines.

Answer: For DOE sites that are on the National Priorities List, or that are being cleaned up pursuant to CERCLA, DOE must comply with the CERCLA program. Pursuant to CERCLA, EPA has developed a comprehensive set of guidelines for cleaning up any contaminated sites. These guidelines are prescribed by CERCLA, are promulgated in the National Oil and Hazardous Substances Pollution Contingency Plan, and are further explained in EPA guidance on conducting long-term engineering studies under CERCLA. The cleanup process requires that any

applicable or relevant and appropriate Federal or state requirements be attained when performing the cleanup. EPA has generally not established national standards for cleaning up contaminated sites, whether radioactive or hazardous contaminants are involved. The exception is standards for cleanup and disposal of uranium mill tailings (e.g. at the "Monticello Properties"). We have also provided overall guidance applicable to the cleanup of the Marshall Islands and Johnson Atoll.

Question #14: How would the Agency compare the cleanup standards used by the Russians at Chernobyl with those of DOE's for its weapons sites?

Answer: Russian criteria are not in final form at present. However, for some cases the Russians are using 500 mrem/year as an upper bound for members of the public returning to contaminated areas. The DOE has published an upper bound of 100 mrem/year. EPA has not endorsed use of either of these values for cleanup purposes. They correspond to lifetime risks of approximately one in 60 and one in 300, respectively, for lifetime exposure at these levels.

Question #15: Assistant Secretary Wade made it clear that compliance schedules were not factored into the prioritization report that DOE issued ranking its sites by danger to public health. This is in contrast to EPA's general practice. What action is EPA taking to get DOE to incorporate compliance schedules when planning and budgeting?

Answer: The priorities for cleanup at Federal facilities are currently driven by deadlines established by statute. As detailed in CERCLA Section 120(e), a Federal facility must commence a Remedial Investigation/Feasibility Study within six months of listing on the National Priorities List. Physical on-site remedial action must commence within 15 months after the completion of the investigation and study. Schedules for the implementation of RCRA corrective action are driven by the statutory deadlines for permit issuance.

As EPA develops these comprehensive agreements with DOE and the states, cleanup priorities are established within the agreements based on the relative threats to human health and the environment. Resources to clean up past hazardous waste problems at Federal facilities will require a rational process for determining priorities. Along with assessing the risk to human health and the environment, the process must try to reconcile the

statutory requirements for action provided in RCRA and CERCLA with the constraints of the Federal budget process. EPA looks forward to working with DOE, the Congress, and others to solve this national problem of setting priorities for cleanup.

For projects required to bring a facility into compliance with day-to-day requirements of environmental regulations, the A-106 process is a system designed to identify environmental control projects as required to meet the statutory and regulatory requirements. The Office of Management and Budget has established a hierarchy of nine different A-106 compliance categories divided into three distinct classes. EPA places its highest priority on Class 1 projects. These projects are needed at Federal facilities which are in physical noncompliance and/or have received an enforcement action from EPA or a state. Class 2 projects are next in priority to EPA. These projects are needed at facilities which are not yet out of compliance, but will be if not implemented prior to certain deadlines in the future. Class 3 projects include a variety of situations which are of less importance to EPA at present but which may be important compliance issues in the future, if not constructed.

Question #16: What improvements could DOE make in the methodology of the prioritization report?

Answer: EPA was not involved in the development of the prioritization report nor has this report undergone formal Agency review. We understand that DOE is undertaking a major new effort to develop a 5-year plan for returning the nuclear weapons complex to compliance and setting priorities for cleanup. DOE has stated it wants EPA to participate in this planning and EPA is looking forward to involvement in such planning.

Question #17: DOE has indicated that it intends to implement Title III-Emergency Planning and Community Right to Know (Superfund) at its weapons production facilities. What progress has EPA witnessed?

Answer: At this time, Federal agencies are not legally obligated to comply with the requirements of Title III, as they are not included in the statute's definition of "person" contained in section 329(7). However, on September 30, 1988 EPA sent a letter to the heads of all Federal agencies strongly encouraging voluntary compliance with all the requirements of Title III. A key point of the letter was that contract operators of government owned-contractor operated (GOCO)

facilities are subject to all the provisions of Title III to the same extent as any other operator. Since DOE's weapons production facilities are GOCOs, the contract operator is responsible for ensuring compliance with Title III as it is applicable to the facility. DOE has acknowledged that the contractors are responsible for compliance and has issued two guidance memoranda to its program and operations offices outlining the requirements of Title III and its applicability to GOCO facilities.

As part of the Administrator's September 30 letter, EPA requested information on the current status of Title III implementation. In response to this request DOE is surveying its facilities to assess the extent of compliance.

Question #18: When does EPA plan to make DOE carry out provisions of Title I-section 126 (Superfund), which sets out standards for workers involved in hazardous waste operations, at the DOE weapons complex?

Answer: Title I, Section 126 of SARA amends the Occupational Safety and Health Act (OSHA) which is codified at 29 U.S.C. Section 655. As such, the requirements referred to in your question fall under the jurisdiction of the Department of Labor. This provision was passed with SARA, but it is not part of the Superfund; thus, the Department of Labor has jurisdiction over these requirements.

Question #19: According to the Agency's latest Federal Facility Compliance Strategy book, the EPA is planning on establishing a Government Contractor Enforcement Strategy plan. What is the status of this publication?

Answer: EPA has formed an Agency-wide GOCO Enforcement Workgroup, co-chaired by the Office of Federal Activities and the Office of Enforcement and Compliance Monitoring, with representatives from the Office of General Counsel and all EPA Headquarters media program offices. The GOCO workgroup is currently developing a draft GOCO policy/strategy and a draft should be completed for internal EPA "Red Border" review by early summer. The final GOCO policy is scheduled for issuance by the end of Fiscal Year 1989 (September). EPA continues to encourage actions against GOCOs who violate environmental laws, and has taken several actions under RCRA against GOCOs over the past year.

Question #20: Has DOE adequately completed its responsibility under section 3016 of RCRA, to submit to

EPA an inventory of the amount, nature, and toxicity of hazardous wastes and the environmental contamination at the DOE weapons production facilities? Please forward to the Committee a copy of the inventory that DOE has completed and submitted to EPA.

Answer: DOE has adequately completed its responsibility under Section 3016 of RCRA. Enclosure 5 contains copies of the original questionnaires for all the DOE weapons plant facilities with the exception of the WIPP facility. The WIPP facility is a DOE pilot project which is currently under construction and has yet to receive any hazardous waste. Section 3016 of RCRA requires Federal agencies to complete the inventory at facilities they own(ed) or operate(d) at which hazardous waste has been stored, treated or disposed.

The questionnaire for Johnson Atoll has been included, but note that the responsibility for reporting the hazardous waste activities at this facility belongs to DOD/Air Force.

Question #21: Have any Superfund related-epidemiological studies been conducted at DOE weapons sites? If not, why not?

Answer: Yes; two Superfund-related epidemiological studies have been initiated at DOE weapons facilities: the first was initiated and completed by the Agency for Toxic Substances and Disease Registry at the Oak Ridge, Tennessee, facility in response to a mercury release from the Y-12 plant. The results were negative in that the levels of mercury found in the persons studied were within an acceptable range for mercury in humans. The second is being conducted by the Centers for Disease Control (CDC) at the Hanford facility in Richland, Washington. The CDC thyroid study should take three to four years to complete. Moreover, CDC is in the process of determining whether it should conduct a similar study on the relationship of uranium releases to lung cancer from the DOE Feed Materials Production Center near Fernald, Ohio.

Question #22: Have the Departments of Energy and Defense facilities and their contractors been meeting the reporting requirements of TSCA? Does the Agency have notices on file to that effect?

Answer: Generally, the EPA Office of Toxic Substances would not expect reports from the Departments of Defense and Energy since they do no generally manufacture, process or distribute in commerce chemical

substances or mixtures. These are the general category of persons required to report information under the Toxic Substances Control Act (TSCA). Contractors for DOD and DOE, who manufacture, process or distribute in commerce any chemical substances or mixtures, are covered by TSCA. Contractors are required to report information even if they only supply chemical substances or mixtures to the DOD or DOE, unless they have a national security waiver. EPA is not aware of any such waiver.

Question #23: There seems to be a difference regarding the attention and resources that EPA focuses on federal facilities versus private sector polluters. Please compare two like facilities, one private and one federal, that are similar in contamination problems and public health danger, in terms of EPA committed resources and funds, including in-house and contractor personnel.

Answer: EPA uses similar average pricing for its oversight of Federal and non-Federal projects at sites listed on the National Priorities List. From a planning perspective, the resources in both cases are made available on a project based level. Therefore, similar sites with a similar number of projects are estimated to cost the same. However, it should be noted that there are a limited number of Federal facilities which are much larger and much more complex than the average non-federal site. Because of their size and complexity, many of these Federal facilities will have more projects. To the extent that the number of projects at these facilities exceed those at most non-Federal sites, the facilities could require more resources devoted to oversight in the long run.

Question #24: What is and has been the status of EPA's enforcement and compliance effort at the Army's chemical weapons production facility in Aberdeen, Md.?

Answer: The state of Maryland has been authorized to carry out primary responsibility for pre-HSWA, Subtitle C RCRA enforcement. As an authorized state, Maryland has taken the lead with regard to RCRA enforcement at the Aberdeen Proving Ground (APG). Based on violations detected during various RCRA compliance inspections, APG entered into a Consent Order with Maryland on August 24, 1988. On October 20, 1988, the Army and Maryland entered into a Consent Judgment regarding RCRA hazardous waste storage and generation concerns. The Consent Judgment contains provisions for stipulated penalties. EPA, Region III is conducting appropriate oversight activities and compliance evaluation inspections in conjunction with frequent state

inspections.

Three civilian employees of APG were recently convicted in Federal District Court of criminal violations of RCRA and the Clean Water Act. Criminal charges were brought for knowingly storing and disposing of hazardous waste without meeting the applicable RCRA notification and permitting requirements. Sentencing is scheduled for May 5, 1989.

- APG is proposed for inclusion on the National Priorities List. EPA has established a 120-day timeframe for the negotiation of a CERCLA Interagency Agreement with APG and the State of Maryland. Region III hopes to have negotiated a comprehensive agreement for the investigation and cleanup of the facility prior to the expiration of the negotiation period (July 27, 1989).

Statement by
RICHARD A. MESERVE

TO

SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS
SENATE DIRKSEN OFFICE BUILDING--Room 342

January 26, 1989

I am very pleased to join you this morning to testify on behalf of the National Academy of Sciences concerning the Department of Energy's nuclear weapons production complex. My name is Richard Meserve. I have served as Chairman of the Academy's Committee to Assess Safety and Technical Issues of DoE Reactors and am now serving as Chairman of the Academy's Committee to Provide Interim Oversight of the DoE Nuclear Weapons Complex.

Dr. Frank Press, the President of the National Academy of Sciences, was invited to testify. As indicated in the letter to Senator Glenn of January 11, 1989, Dr. Press had a long-standing commitment to be in Morocco today. His trip precluded his participation and he asked me to convey his regrets.

I shall first describe some of the past work that has been undertaken by the Academy relating to the nuclear weapons complex. I shall then turn to the work that is currently underway.

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I.

Shortly after the accident at the Chernobyl Nuclear Power Station in April 1986, Secretary Herrington of the Department of Energy requested the National Academy of Sciences and the National Academy of Engineering to establish a committee to examine safety and technical issues at the Department's major reactors. At the suggestion of the Department, the Committee focused its efforts initially on the Department's production reactors -- the reactors used to produce tritium and plutonium for use in nuclear weapons. Those reactors include the N reactor at the Hanford Nuclear Reservation in Washington and the K, L, and P reactors at the Savannah River Plant in South Carolina. The Committee issued a report, entitled Safety Issues at the Defense Production Reactors, in October 1987. The report emphasized the need to establish a clear and unambiguous safety framework for the operation of the reactors, discussed a variety of technical issues that the Committee uncovered in the course of its work, and made several recommendations for improved management. I had the opportunity to testify before the Senate Armed Services Committee with regard to that report on October 30, 1987.

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In addition to the operation of the production reactors, the Department of Energy operates five other large reactors to produce radioisotopes for medical, industrial, and military purposes, to provide neutron sources for use in scientific research, and to conduct radiation and other experiments in support of the government's space, fusion, and advanced-reactor programs. These reactors include the Advanced Test Reactor and the Experimental Breeder Reactor II, located at the Idaho National Engineering Laboratory; the Fast Flux Test Facility, located at the Hanford Nuclear Reservation; the High Flux Beam Reactor at Brookhaven National Laboratory on Long Island; and the High Flux Isotope Reactor at Oak Ridge National Laboratory in Tennessee. The Committee's conclusions and recommendations with regard to these additional reactors are found in its report, entitled Safety Issues at the DoE Test and Research Reactors, which was issued in August 1988. Like the earlier report on the production reactors, the report identified a series of issues relating to the Department's operation of the test and research reactors that we urged the Department to address.

Your invitation to testify this morning asked, among other matters, if I would discuss the Department's efforts to respond to the Academies' study of the production reactors. Upon the issuance of the two reports that I have described, the Academies had completed their work and the Committee was disbanded. There has thus been no organized examination by the Academies of the adequacy of the Department's response to the various recommendations that were made by the Committee.

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I know, however, that the Department has submitted a detailed report to Congress setting out its response to the Committee's recommendations relating to the defense production reactors.* The report indicates that the Department has endorsed the Committee's recommendations and has taken actions to respond to all of them. Although neither the Academy Committee nor I have had occasion to examine the substance of the Department's activities in detail, it appears that the Department has taken the report very seriously and has attempted to respond to it in a thorough fashion.

II.

As I mentioned at the outset, the Academies also have activities that are now underway relating to the nuclear weapons complex. Section 3134 of the Defense Authorization Act of 1988 provided that the Academies were to review the operation of the Department's defense nuclear facilities. In response, the Academies formed a committee of 23 individuals. The members provide expertise in chemical processing, criticality safety, environmental assessment, explosives safety, fire safety, management, materials handling, materials science, nuclear safety, remote systems technology, and seismic risk. A list of the members, including concise biographical sketches, is set out as an appendix to this testimony.

* Department of Energy, Action Plan for Resolution of Technical Recommendations: Response to the National Academy of Sciences and National Academy of Engineering's Report on Safety Issues at the Defense Production Reactors (May 1988).

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The Committee's efforts focus on the various facilities engaged in the chemical processing of the materials that are used in weapons and on the production of components for and assembly of those weapons. Because of the previous work by the Academy relating to the production reactors, the Committee will not encompass the production reactors. Moreover, the Committee will not re-examine issues relating to the safe handling of nuclear weapons, the waste isolation pilot plant, transportation safety, activities at the Nevada test site, or safeguards and security.

Our final report will include a consideration of safety and technical issues at the facilities and a discussion of steps that would enhance the safety of operation of these facilities. It will also include a consideration of the environmental impacts of these operations. Like the report on the production reactors, I expect that the Committee will make several recommendations for the Department's consideration.

The Committee's work is now well underway. The Committee has visited the chemical processing facilities at the Hanford Nuclear Reservation in Richland, Washington and the Y-12 plant in Oak Ridge, Tennessee. Future visits are planned over the next several months to the Idaho Chemical Processing Plant in Idaho Falls, Idaho; the Rocky Flats Plant in Golden, Colorado; the Los Alamos National Laboratory in Los Alamos, New Mexico; the Sandia National Laboratory in Albuquerque, New Mexico; the Pantex Plant in Amarillo, Texas; the Lawrence Livermore National Laboratory and the Sandia National Laboratory in Livermore, California; and the Savannah River Plant in Aiken, South Carolina. Although the Committee is not able to visit all of the facilities in the complex, we have sought to examine a representative cross section. We believe our examination will provide an adequate foundation to provide knowledgeable and helpful recommendations.

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We anticipate the issuance of our final report on schedule in December 1989. Because the Committee's work is only now under way, I am not able at this point to predict the substance of our report. I would welcome the opportunity to appear before you once our work is completed to discuss our conclusions.

Thank you.

Biographical Sketches of Committee Members

RICHARD A. MESERVE is a partner in the Washington law firm of Covington & Burling. He holds both a law degree from Harvard Law School and a Ph.D. degree in applied physics from Stanford University, where he did postdoctoral work on the theoretical properties of paramagnets and techniques to calculate molecular properties. In 1976, he was a clerk for Supreme Court Justice Harry A. Blackmun, and in 1977 he was appointed Legal Council and Senior Policy Analyst in the White House Office of Science and Technology Policy (OSTP). At OSTP he helped develop policies designed to promote the technological advance of American industry and conducted reviews of energy technology issues. In addition, he served as executive director of an interagency committee concerned with nuclear power plant safety. Mr. Meserve has been a member of several study committees of the National Research Council, including the Panel to Study the Impact of National Security Controls on International Technology Transfer. Recently he served as chairman of the National Research Council Committee to Assess Safety and Technical Issues at DOE Reactors.

RONALD L. ATKINS is a research chemist for the Naval Weapons Center at China Lake. His research deals with the synthesis and photochemistry of small ring heterocyclic compounds, the synthesis of polynitroaromatic and heterocyclic compounds, and the synthesis and study of the photostability of dye molecules. He received a Ph.D. degree in organic chemistry from the University of New Hampshire.

ALBERT CARNESALE is professor of public policy and academic dean, J. F. Kennedy School of Government, Harvard University. His expertise is in nuclear energy policy and nuclear weapons policy. He has worked as a scientist with the U. S. Arms Control and Disarmament Agency and served as an advisor to the U.S. delegation to the Strategic Arms Limitation Talks. He was head of the U.S. Delegation to the International Nuclear Fuel Cycle Evaluation. He is a member of the American Society for Engineering Education and the American Nuclear Society. He holds a Ph.D. in nuclear engineering from North Carolina State University.

JESS M. CLEVELAND is project chief for the Transuranium Research Project of the U.S. Geological Survey. His research focuses on the chemistry and environmental impact of transuranium elements. He has worked at both Rocky Flats and Hanford Labs. He is author of the book, The Chemistry of Plutonium. He was chairman of the Plutonium Thermochemical Review Group and is a member of the program review committee of the Earth Sciences Division at Lawrence Berkeley Labs. He holds a Ph.D. in inorganic chemistry from the University of Colorado.

DAVID G. HOEL is director of the Biometric and Risk Assessment Program at the National Institute of Environmental Health Sciences. His work on the application of statistics and mathematics to biology and epidemiology has focused on statistical inferences from sequential procedures. He has served as associate director for the Radiation Effects Research Foundation, Hiroshima. He holds a Ph.D. degree in statistics from the University of North Carolina.

WILLIAM E. KASTENBERG is a professor in the Mechanical, Aerospace, and Nuclear Engineering Department at the University of California, Los Angeles. He has just completed three years as chairman of that department. His research focuses on nuclear reactor safety, the development of risk-benefit and cost-benefit analysis, and environmental modeling for nuclear power installations. He has served as a senior fellow of the Advisory Committee on Reactor Safeguards, where he developed methods for applying probabilistic acceptance criteria to nuclear and nonnuclear technologies. He has been a consultant to a number of other governmental panels, including the President's Nuclear Safety Oversight Committee. He is the author of over 100 journal and proceedings publications relating to reactor safety and risk assessment, and recently served as a member of the National Research Council Committee to Assess Safety and Technical Issues at DOE Reactors. He is currently a member of the DOE Advisory Committee on Nuclear Facility Safety.

PAUL KOTIN is currently a consultant on pathology. Formerly he was senior vice president for health, safety and environment at the Johns-Manville Corporation. Previous to that he served at Temple University as dean of the school of medicine and vice president for health sciences. He is also a former director of the National Institute of Environmental Health Sciences. His work focuses on the mechanisms of carcinogenesis and on environmental factors relating to cancer. He is the recipient of the Knudsen Award from the American Occupational Medicine Association, and was the Gehrman Lecturer for the American Academy of Occupational Medicine. He is a fellow of the College of American Pathologists and a member of the American Association of Cancer Researchers and the American Association of Pathologists and Bacteriologists.

DENNIS J. KUBICKI is a fire protection engineer in the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission (NRC). He is responsible for reviewing fire protection programs at nuclear power plants, and determining their degree of conformance with NRC guidelines and requirements. Previously he was assistant manager for Industrial and Fire Safety in the NASA Safety Office. He has extensive experience in evaluating fire protection for buildings, residences, institutions, and municipalities. He is a member of the National Fire Protection Association, the Society of Fire Protection Engineers, and the American Society of Safety Engineers. He holds a Master's Degree in Safety from the University of Southern California (Eastern Division) and a Master's Degree in Business Administration from the University of Maryland.

J. CARSON MARK has retired from his position as leader of the Theoretical Division of Los Alamos National Laboratory. His research is involved with group theory, transport theory, hydrodynamics, and neutron physics. He has served on the Science Advisory Board of the U.S. Air Force, and was a member of the Nuclear Regulatory Commission Committee on Reactor Safeguards. He is a member of the American Physical Society and the American Mathematical Society.

MICHAEL R. OVERCASH is a professor of Biological and Agricultural Engineering, jointly with the Department of Chemical Engineering, at North Carolina State University. His work is focused on the evaluation and disposal of toxic wastes, including site remediation and source reduction and beneficiation. He has served on many scientific and governmental panels on these and related topics. He was recently a member of the North Carolina Governor's Waste Management Board and has drafted guidelines for sludge land treatment in Delaware. His testimony before the congressional Committee of Science and Technology explored the reasons why technologies available for eliminating or treating hazardous wastes have not had an impact on landfill usage in the U.S. In 1986 he was awarded the Environmental Protection Agency Distinguished Scientist Award. He is a member of the American Society of Agricultural Engineers and the American Institute of Chemical Engineers.

WOLFGANG K. H. PANOFSKY is currently director emeritus and professor of physics at the Stanford Linear Accelerator Center (SLAC). He was director of Stanford Linear Accelerator Center from 1961-1984 and prior to that was the director of the High Energy Physics Laboratory at Stanford University. He has served with many working groups and commissions, including the President's Science Advisory Committee and the International Union of Pure and Applied Physics. He has received the E. O. Lawrence Award (61), the California Scientist of the Year Award (67), the National Medal of Science (69), the Franklin Institute Award (70), and is also the recipient of the Enrico Fermi Award (79). He is a member of the National Academy of Sciences and a fellow of the American Physical Society.

RICHARD LEE SAGER, JR. is loss prevention manager at the Lithium Corporation of America in Gastonia, North Carolina. He is responsible for overall guidance of the Corporate Safety Program, including staffing and overseeing the Health Services Department, assuring that all four company facilities are in compliance with corporate and federal safety regulations, and coordinating the Industrial Hygiene Program to establish baselines. Previously he has been supervisor for safety and environmental engineering for several mining and ore processing companies. He has extensive experience with the regulations of both the Occupational Safety and Health Administration (OSHA) and the Mining Safety and Health Administration (MSHA). He holds of B.S. degree in Mechanical Engineering from Vanderbilt University.

RICHARD B. SETLOW is associate director of Life Sciences and chairman of the Biology Department at Brookhaven National Laboratory. His work in molecular biophysics has studied the effect of light on proteins, viruses, and cells. His research includes studies of nucleic acids and their repair mechanisms, as well as studies on environmental carcinogenesis. He received the Finsen Medal in 1980. He is a member of the National Academy of Sciences and the American Academy of Arts and Sciences.

DAVID R. SMITH has recently retired from his position as leader of the Criticality Safety Group in the Health Division at Los Alamos. He has served as consultant on criticality reviews at many facilities, including Argonne, Oak Ridge, and Hanford. He has a long involvement with developing and maintaining national and international safety standards for the handling, processing, and storing of fissile material, working with the American Nuclear Agency Technical Committee on Criticality Alarm Systems. He is a fellow of the American Nuclear Society.

STEWART W. SMITH is currently on leave from the University of Washington to serve as President of the Incorporated Research Institutions for Seismology, a 58-member consortium of U.S. universities that is developing new global and portable seismographic networks with the support of the U.S. National Science Foundation. At the University of Washington he served as Professor and Chairman of Geophysics from 1970-1980, and is presently Professor of Geophysics and Adjunct Professor of Geological Sciences. His research areas include seismicity, tectonics, and earthquake hazards. He has published widely in these fields, and served on numerous scientific and governmental panels concerning these topics. One such recent assignment was as Chairman of a workshop for the Congressional Office of Technology Assessment concerning the seismic verification of nuclear testing treaties. He has had extensive experience in the siting of commercial nuclear power plants and other important structures in earthquake prone regions.

ROGER W. STAEHLE is an independent consultant on metallurgical engineering and corrosion, on leave from the University of Minnesota, where he has been professor of metallurgical engineering and dean of the Institute of Technology. His work is in the passivity of metals and the processes of stress corrosion cracking, fatigue, and fracture. Research topics include surface chemistry and the optical properties of surfaces. He has been a consultant to many industrial and governmental organizations, and served as chairman of an advisory panel to the Metallurgy Division, National Bureau of Standards. In 1980, he received the Willis Rodney Whitney Award from the National Association of Corrosion Engineering. He is a member of the National Academy of Engineering and a fellow of the American Society for Metals.

JOHN E. TILL is president of Radiological Assessments Corporation, located in Neeses, S.C. He is also president and owner of the Embeford Dairy Farm. His expertise is in the assessment of radionuclide releases to the environment. Major fields of interest are the development and implementation of accurate, reliable and fast environmental monitoring programs, and the consolidation of current radiological assessment methods to provide a concise evaluation of models and their ranges of applicability. He has received the Anderson Award of the Health Physics Society and has served on the Executive Committee Science Advisory Board of the Environmental Protection Agency. He is a consultant to the Nuclear Regulatory Commission Committee on Reactor Safeguards and a member of the National Cancer Institute Committee on Assessment of Dose Due to Fallout Radiiodine. He holds a Ph.D. in nuclear engineering from the Georgia Institute of Technology.

VICTORIA J. TSCHINKEL is senior consultant with the law firm of Landers, Parsons, and Uhlfelder in Tallahassee. Previously she was secretary of the Florida Department of Environmental Regulation. She was instrumental in rewriting Florida's water quality standards and in revising the state's groundwater protection rules. She has served on the DOE Energy Research Advisory Board and on an Environmental Protection Agency Panel on toxic pollution, and is currently a member of the DOE Advisory Committee on Nuclear Facility Safety. She received an A.B. degree in zoology from the University of California, Berkeley.

F. WARD WHICKER is a professor in the Department of Radiology and Radiation Biology, Colorado State University. His areas of expertise include the movement and impact of fission products in various environments and ecosystems, the ecological effects of gas stimulation from buried nuclear devices, the effects of radiation on small mammals, and transport of fission products through the food chain. He spent one recent sabbatical year as Adjunct Senior Ecologist at the Savannah River Ecology Lab. He has served as consultant and committee member for many industrial and governmental studies, including the Risk Assessment for Radionuclides conducted by the Science Advisory Board of the Environmental Protection Agency. He is a fellow of the American Association for the Advancement of Science and a member of the Health Physics Society and the Ecological Society of America.

WILLIAM L. WHITTAKER is director and senior research scientist of the Field Robotics Center of the Robotics Institute at Carnegie Mellon University. His research focuses on the development of robots for many diverse applications, including reconnaissance and cleanup in nuclear environments, hazardous waste management, planetary exploration, automated mining, autonomous haulage, and automated excavation of buried pipes. His work on teleoperator transporters for radiological emergency response and recovery found direct use in remote systems for recovery of the reactor basement at Three Mile Island. For his robotics work he has received the Science Digest Top 100 U.S. Innovators Award. He holds a Ph.D. in Civil Engineering from Carnegie Mellon University.

SUZANNE H. WOOLSEY is partner-in-charge of the Coopers & Lybrand consulting group of Washington, D.C. Her work centers around management and organizational reviews for non-profit and higher-education institutions. Her research includes analyses of university-industry links, medical center management, capital budgeting and planning, cost accounting and cost allocation, and financial management and budgeting. She has served on several committees of the National Academy of Sciences, and many reviews of non-profit institutions. She holds a Ph.D. in clinical and social psychology from Harvard University.

GEROLD YONAS is president of Titan Technologies, located in San Diego. Previously he was Chief Scientist and Acting Deputy Director of the Strategic Defense Initiative Organization (SDIO). Before joining SDIO he was Director of Pulsed Power Sciences at Sandia National Laboratories. His work at Sandia was involved with intense electron and ion beams, high power microwaves, lasers, high density plasma, radiation sources, and energy conversion devices. Dr. Yonas is a recipient of the Secretary of Defense Medal for Outstanding Public Service. He is a fellow of the American Physical Society, a member of the American Institute of Aeronautics and Astronautics, and has served on the executive Board of the Controlled Nuclear Fusion Division of the American Nuclear Society.

LETTERS SUBMITTED BY DR. AHEARNE

Advisory Committee on Nuclear Facility Safety

to the
United States Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

December 14, 1988

Honorable Sam Nunn
Chairman
Committee on Armed Services
United States Senate
Washington, D.C. 20510

Re: Advisory Committee on Nuclear Facility Safety Report on the DOE
Production Reactors

Dear Mr. Chairman:

By the National Defense Authorization Act for fiscal year 1988 you initiated formation of the National Research Council's Committee to Provide Interim Oversight of the DOE Weapons Complex. Important elements of the weapons complex are the production reactors and the nuclear material process facilities. The Secretary of Energy has formed the Advisory Committee on Nuclear Facility Safety to provide independent safety review of the Department of Energy's nuclear reactors, including the production reactors, and the nuclear material process facilities. In order to provide you timely information on safety issues within the weapons complex, a division of labor has been agreed to between the DOE Advisory Committee on Nuclear Facility Safety and the National Research Council's Committee to Provide Interim Oversight of the DOE Weapons Complex. The Advisory Committee is providing information on the production reactors. The National Research Council's Committee is reporting on the balance of the weapons complex.

Description of the Advisory Committee on Nuclear Facility Safety

The Advisory Committee on Nuclear Facility Safety was established by the Secretary of Energy in response to a recommendation made by the National Research Council's Committee to Assess Safety and Technical Issues at DOE Reactors.* In establishing the Advisory Committee, the Department of Energy met all aspects of the National Research Council's recommendation which included:

*Committee to Assess Safety and Technical Issues at DOE Reactors, Safety Issues at the Defense Production Reactors - A Report to the U. S. Department of Energy, National Academy Press, Washington, D.C., 1987.

- o Members are of recognized stature with expertise covering the full range of disciplines relevant to reactor safety.
- o Membership includes individuals from outside the DOE community.
- o The Advisory Committee has the authority to set its own agenda.
- o The Advisory Committee has the authority to review both the production and process efforts of the Department of Energy including review of design, safety analysis, operation, management, inspection and enforcement.
- o The Advisory Committee is supported by a full-time, technically qualified staff and a budget adequate to obtain external technical assistance as required.
- o The bulk of the Advisory Committee's work is unclassified and available to the public.

Membership and affiliations of the Advisory Committee are shown in Table 1. Continuity with past reviews is achieved since three members of the Advisory Committee were also members of the National Research Council's Committee to Assess Safety and Technical Issues at DOE Reactors and two members also serve on the National Research Council's Committee to Provide Interim Oversight of the DOE's Weapons Complex.

Members work part-time on the Advisory Committee. They provide peer review and, as recommended by the National Research Council, an assurance that the Department of Energy is aware of and utilizes the most up-to-date safety technology in its operation of nuclear facilities.

Work by the Advisory Committee began in May 1988. Subcommittees have been established to examine 1) the return to full power of the Savannah River reactors, 2) safety assessments of the new production reactors, 3) the use of probabilistic safety assessments in the DOE weapons complex, 4) quality assurance, 5) radiological safety, 6) safety issues at the nuclear material process facilities, 7) safety issues at the Fast Flux Test Facility, and 8) the restart of Savannah River reactors. Subcommittees will be formed as issues are identified and found to require in depth examination by members and consultants. The full Advisory Committee meets approximately monthly and provides reports to the Secretary of Energy on a timely basis.

Safety and Technical Issues at the Production Reactors

There are two production reactor facilities in the DOE weapons complex--the N-reactor located in Richland, Washington and the Savannah River reactors located near Aiken, South Carolina. The N-reactor is currently shut down and being "moth-balled" in cold standby. It will not be a producer of nuclear materials in the near term. Remaining activities at the N-reactor

Table 1. Membership and Affiliations of the
Advisory Committee on Nuclear Safety

Dr. John Ahearne (Chairman)	Resources for the Future Washington, DC
Dr. Richard Denning	Battelle Memorial Institute Columbus, OH
Prof. William E. Kastenberg	University of California Los Angeles, CA
Prof. Harold Lewis	University of California Santa Barbara, CA
Prof. James E. Martin	University of Michigan School of Public Health Ann Arbor, MI
Prof. Mihran Jacob Ochanian	University of Florida Gainesville, FL
Dr. Dana A. Fowers	Sandia National Laboratories Albuquerque, NM
Mr. Paul D. Rice	Georgia Power Company Waynesboro, GA
Dr. Elmer G. Schwartz	University of South Carolina Columbia, SC
Dr. Robert Seale	University of Arizona Tucson, AZ
Dr. Gerald Tape	Associated Universities, Inc. Washington, DC
Ms. Victoria Tschinkel	Landers and Parsons Tallahassee, FL

site include completion of safety upgrades initiated before the decision to shut down W-reactor and completion of a probabilistic safety assessment of the reactor. The attention of the Advisory Committee has been focused on the Savannah River reactors as the nation's sole source of new nuclear materials for weapons.

There have been as many as five production reactors at the Savannah River site. The R-reactor has long been shut down. The C-reactor has recently been retired because of stress corrosion cracking in the reactor vessel. The F, K and L reactors are still operational.

There are safety issues at the Savannah River site. Some of the more important issues that are being followed by the Advisory Committee are:

- o Analyses to date are unable to demonstrate that the emergency core cooling systems would maintain cooling of the reactor cores in the event of a large pipe break accident at full power.
- o The reactors are aging, and deterioration such as the stress-corrosion cracking of the C-reactor could have safety implications and certainly foretell the end to the useful lives of these reactors.
- o Safety analyses at the reactors are not up to the standards developed within the commercial nuclear power community.
- o The inadequacy of seismic constraints identified at F-reactor not only indicates that similar problems exist at the other reactors, but raises questions about configuration control at these plants.
- o The Department of Energy in the past has not provided the in-depth safety oversight of the Savannah River reactors consistent with its obligation to assure public safety and the standards established by the U. S. Nuclear Regulatory Commission in its oversight of commercial nuclear reactors. The independent internal safety organization, Environmental, Safety and Health (EH), has a number of important initiatives that should improve the DOE oversight role, for example -- on-site presence by DOE staff at the plant has increased substantially.
- o During 1989 the operating contractor will change, resulting in possible changes in operating practices and procedures.

The Department of Energy and the operating contractor for the Savannah River reactors are aware of these safety issues and efforts are underway to correct deficiencies. The reactors are limited in the power they can generate to levels that assure the core can be kept cool under pipe-break

accident conditions. Modifications are being made to the emergency core cooling system (ECS) and analyses are being done in the hopes of demonstrating the ECS would be effective at maximum power. We will follow these activities closely. Pending the results of these analyses, we cannot advise as to any power level being demonstrably safe.

The Advisory Committee is closely scrutinizing these efforts to improve upon the safety at the Savannah River reactors. A major element of work by the Advisory Committee has been review of the DOE efforts to upgrade its approach toward reactor safety and the safety oversight it provides. Subcommittees have been established to closely review the efforts to improve the emergency core cooling systems, the efforts to conduct up-to-date safety analyses, and the quality assurance practices at the site.

The Advisory Committee recently investigated widely reported incidents during the restart of P-reactor. The investigation showed that the incidents themselves were not significant. At no time was the P-reactor out of control and at no time was there a threat to the safety of the reactor facility or the public. The investigations did lead the Advisory Committee to conclude that there are still weaknesses in the Department of Energy's approach to safety at the Savannah River reactors. The Advisory Committee recommends:

1. Despite the excellent industrial safety awareness program of the current operating contractor, a degree of complacency has apparently developed in the operation of the reactor. The willingness to proceed to power in the face of a large discrepancy in estimated reactivity during the recent start-up of P-reactor did not show an appropriate degree of nuclear safety awareness. In follow-up interviews performed by an EH review committee, the same lack of nuclear safety awareness was noted.
2. Operational readiness reviews for the Savannah River reactors are not sufficiently thorough. A well-developed, comprehensive procedure for operational readiness reviews needs to be established to avoid oversights such as that which led directly to the incidents during the P-reactor startup.
3. Communications between the operating contractor and the Savannah River Operations Office of the DOE are still not adequate. Deficiencies in these communications contributed to the inadequacies of the operational readiness review for the P-reactor restart. The deficiencies also contributed to public uncertainty in the safety of the P-reactor following the restart incidents.

The Department recently developed a Restart Strategy document, which the Advisory Committee has reviewed. Enclosed is a copy of our report on that document to Secretary Herrington. We complimented DOE for turning its attention to the problems at Savannah River and provided advice on the

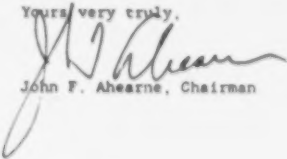
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adequacy of its operations. Substantial resources must be applied and many months of hard work successfully completed before restart. We continue to have significant concerns on how DOE organizations have implemented their approach so far.

Further recommendations to the Secretary of Energy concerning the safety of the Savannah River production reactors will be made as findings of the Advisory Committee's subcommittees become available.

I and other members of the Advisory Committee are available to answer any questions you may have on this response.

Yours very truly,



John F. Ahearn, Chairman

Enclosure

cc: Honorable Les Aspin
Honorable John S. Herrington

Advisory Committee on Nuclear Facility Safety

to the
United States Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

December 14, 1988

Honorable John S. Werrington
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Secretary:

Your Advisory Committee on Nuclear Facility Safety has been reviewing the Department's plans for restarting the Savannah River (SR) reactors. A subcommittee spent several days at SR and at DOE headquarters discussing the problems to be resolved prior to restart. We also obtained the services of three consultants. The full Committee¹ has discussed reports from the subcommittee and the consultants and several versions of the DOE's plan for restart.

As requested by Assistant Secretary Baynard on December 5, 1988, we have reviewed the November 1988 document, "Savannah River Plant K Reactor Restart Strategy". We recognize this document represents a consolidation of the views of EH, DP, SRO, Dupont-SR, and Westinghouse. We appreciate the difficulty of developing in a few months a plan to address problems which have been developing over decades. In our opinion, however, the Restart Strategy document represents only an initial step in DOE's efforts to develop sound operations at SRP.

[We have broad concerns regarding safety philosophy, the overall criteria for restart, and management. In addition, as described in this letter, the Committee has several specific concerns about the present plans for a restart. These cover the three areas Mr. Baynard asked us to examine:

- (1) the technical sufficiency of the criteria,
- (2) the degree to which the criteria address the underlying problems which led to the August events at the F reactor, and
- (3) the adequacy of the strategy to deal with long and short term safety needs.

1. Due to other commitments, Mr. Paul Rice did not participate in developing this report.

Our review represents the Committee's position on information available through the end of November 1988. We recognize that we are commenting on a snapshot of the Department's efforts; we will comment on further developments in the future. We also recognize that some of these concerns may be resolved in the implementation plan, which we understand is forthcoming. Such a plan, which should include schedules, is critical for a successful restart strategy.

Because of the types of issues involved, many of our comments are unavoidably quite technical. We concluded that such technical detail was necessary in order to be precise and to insure accuracy and specificity. Finally, in the following it should be noted that we have also addressed several questions raised by members of Congress in letters about Savannah River.

Safety Philosophy

The Department is currently developing a nuclear safety policy which includes three principles:

- 1) Management and Accountability
- 2) Performance Criteria
- 3) Safety Monitoring

The safety performance criteria are based on principles of safety developed by the International Atomic Energy Agency (IAEA). As adopted by DOE, the criteria are intended to implement the defense-in-depth principle for safety, a time-honored principle used in the commercial sector. The defense-in-depth principle centers on several levels of protection, including successive barriers preventing the release of radioactivity to the environment, protection of these barriers, accident prevention (conservatively designed equipment and good operational practice), and accident mitigation (accident management, engineered safety features, off-site countermeasures). All components of defense-in-depth must be available at all times when a plant is at power.

The Restart Strategy and criteria have not been formulated with this principle in mind, and, in some instances, the defense-in-depth safety philosophy may be compromised, e.g., focusing on accident prevention without a comparable examination of measures for accident mitigation in terms of seismic resistance. Similarly, training focused entirely on "how to" with little attention to "why" is counter to active accident management which prepares the facility, its procedures and its personnel to deal with the unexpected and the unknown so as to assure the health and safety of the public, as well as the on-site personnel. The Department should begin to implement its nuclear safety policy by measuring the current restart strategy and criteria against the policy statement for completeness, timeliness, and adequacy. At

a minimum this can be qualitative, and with time a more quantitative approach can be employed.

The Restart Strategy reflects a recognition that safety standards of the plant have not kept pace with changes that have occurred in the nuclear industry and that these plant safety standards must now be considered unacceptable. The word "unacceptable" is key. The Restart Strategy authors must have intended the list of requirements to be the minimum set of actions needed to bring the plants to an acceptable safety level, even though that level has not been defined. The Department is struggling with how to determine and how to express the criteria for an acceptable safety level.

We suggest that "comparable to commercial standards" is a reasonable objective, but difficult to implement quantitatively. This does not mean one should try to duplicate the thousands of pages of "case law" and guides that make up the commercial standards, but only that the effects of these can serve as a level to seek. The Nuclear Regulatory Commission has promulgated a set of safety goals, but it is not even known if the commercial reactors, which are much more thoroughly analyzed, meet those standards. What is known has become known through detailed, carefully reviewed probabilistic analyses, which are beset by large uncertainty. Such probabilistic analyses have only recently been undertaken for the Savannah River reactors and are not available to guide the establishment of a "comparable to commercial standards" policy.

We believe effective implementation of a nuclear safety policy must be largely subjective, involving the corporate judgments of responsible people knowledgeable about both worlds. That is, in effect, what the Department is attempting through the infusion of people with broad commercial experience into the previously insulated DOE complex. In the end, the judgments of such people about the DOE reactors must prevail if any policy is to be effected.

That, however, leaves open questions of quantitative criteria, such as seismic criteria. To the extent that some conditions of acceptable performance can be quantified (e.g. number of operators in a control room, seismic margin, etc.) they should be, although uncertainties in the estimates should be recognized, and even these are matters of judgment. (Witness the current dispute over whether commercial operators should have degrees.)

We believe that although neither commercial standards of safety nor an acceptable level for DOE reactors can be defined quantitatively, at present, responsible and credible comparisons can be made by people familiar with both, and this is probably the most effective criterion one can use for restart.

Criteria for Restart

Over the past several years many safety related issues associated with the Savannah River reactors have been described in internal DOE and external, independent appraisals. These problems have been recognized and are being addressed. Many programs have been initiated and others are planned in order to achieve the necessary improvements. Collectively they are described under a single program called the Reactor Safety Improvement Program (RSIP), the completion of which will require several years.

The immediate problem is the restart of one reactor, for which the Restart Strategy document has been developed. It is not clear, however, that all of the requirements in this document must be met prior to restart. In the Restart Strategy document there is an absence of a clear-cut safety philosophy upon which the restart strategy and criteria are based. The document seems to alternate between an absolute standard and a safety upgrade approach, and does not clearly identify which actions are essential for restart and which require attention over a longer term but after restart.

Management

Substantial and, to a large extent, justified criticism has focused on weaknesses in management control, training, operator practices, and reporting procedures at SRP. Many elements of the Restart Strategy address these problems. However, the problems do not all fall within the contractor's organization and responsibilities nor with DOE's Savannah River Operations Office. DOE headquarter's operational and regulatory responsibilities require attention so that the field can more effectively achieve an acceptable start-up condition. The Department should maintain the distinction between management and oversight. As stated in the draft DOE Safety Policy, "clear, unambiguous lines of authority" should be established. This includes DOE as well as the contractor. We do not find that to be the present situation, where instructions are being given to the contractor and the SRO by several DOE headquarters organizations. Management directions should be transmitted along a single, clearly identified line. Oversight can be done by several organizations, whose role is to determine present status or to examine past performance. However, their recommendations should be transmitted through an explicit management line.

SPECIFIC CONCERNSOperating Power Level

Establishing the power level for acceptable operation will be a major task, requiring substantially more effort than had been recognized by DOE when the problem was first identified by the National Academy in 1987. It is essential to establish a technically defensible power level for reactor operation. This power level must permit assured cooling of the reactor after a design basis loss-of-coolant accident.

There are two important time periods in a design basis accident in which reactor cooling could be inadequate. During the first few seconds of the accident, the flow through the core drops rapidly but the power remains high until reactor scram has been effected. Significant boiling in flow channels during this phase of the accident could result in flow instability, voiding of flow channels and subsequent rapid heating of the fuel.

The second key phase of the accident occurs after substantial loss of reactor coolant from the break. In this phase, cooling of the core depends on flow from the emergency core cooling system (ECS). The potential entrainment of air into the cooling water as it enters the channel complicates the analysis of the thermal hydraulics. Again it is essential to prevent boiling in the flow channel, since the buoyant vapor would tend to limit the flow of the emergency coolant downward into the assembly. Operating power limits must be established which assure adequate cooling in both phases. The analytical methods that are used to determine these limits should be supported by prototypic experiments. Such "separate effects" experiments which have been completed are of questionable value for determining power limits.

As a consequence, at this time an analytic determination of power limits cannot be derived with any confidence. At present, such power limit calculations must include a number of appropriately conservative safety margins which have not been satisfactorily defined. The power limit which would result from this procedure will likely be a small fraction of the nominal power rating. Unfortunately, the current experimental research program cannot be expected to yield an improved methodology in the near term.

Control Room and Operating Philosophy

A fundamental good practice in the operation of a reactor is to provide the operators with the data needed to allow them to make the decisions necessary to assure that the desired evolutions of the reactor are in compliance with the Technical Specifications. Another fundamental good practice is to keep the

operators' work environment free from distraction and unrelated discussions. We are concerned that both practices may be violated by the Restart Strategy. At Savannah River, an excessive number of representatives of contractor, oversight, DOE/SRO, and DOE Headquarters organizations argue for the right of control room access and physical presence during reactor operations in general, and specifically during startup following a shutdown. These arguments are based on claims of responsibility for plant operational safety and, consequently, for status in the control hierarchy. Because of such claims, the population in the control room during restart is proposed to include a minimum of 12 people:

- 5 - Operators (the minimum)
- 1 - Technical Support Engineer
- 1 - Shift Advisor
- 1 - DOE/SRO On-site Engineer
(5 present for re-Start)
- 1 - ESH/SRO Inspector
- 1 - EH/DOE Hq. Observer
- 1 - DuPont Oversight Representative (RSED)
- 1 - Contractor Operations Manager

12 - Total (minimum)

This number is clearly excessive. Indeed, it is difficult to see how such a large group could communicate effectively to provide prompt attention to any crisis situation. The list of people required for plant control room duties should be reviewed carefully and access limited to essential personnel.

The Staffing Plan for Reactor Operations includes assignments for three different Senior Level people in the Control Room. These include the Certified Senior Reactor Supervisor, the Technical Support Engineer, and the Shift Advisor. The detailed duties of these individuals during startup, normal operation, and in emergency situations will of necessity be altered in crisis situations. The supervisory relationship between these three Senior Level people should be clearly delineated to assure there is an unambiguous chain of authority.

The staffing plan for the Savannah River reactors assigns at least one degreed Certified Reactor Supervisor to each shift crew to provide analytical/technical expertise as a resource to operating personnel. The interim position of Technical Support Engineer (TSE) has also been identified as a part of each shift to provide knowledge of the safety envelope and bases until training of operation personnel has been satisfactorily implemented, implying an unacceptable level of technical expertise and familiarity with the plant by the degreed Certified Reactor Supervisor.

A key tenet of the safe operation of nuclear plants is that plants have to be operated within a well-defined envelope of safe operation. This envelope of safe operation follows directly from the Technical Specifications for the plant. Operators are required to do more than simply follow well-defined procedures. They are also obligated to assure plant operations do not violate the boundaries defined by the Technical Specifications. This is an obligation that cannot be delegated. Unfortunately, the Reactor Restart Strategy does not conform to this tenet. Operators are required simply to follow procedures. Assurance that these procedures do not place the plant outside the safe operating envelope is not to be the responsibility of operators. It has been relegated, instead, to the Technical Support Engineer. The Committee believes this to be a mistake. The responsibility should reside in the hands of the Senior Reactor Supervisor, in which case, the Technical Support Engineer becomes superfluous. The Committee sees no reason why the Senior Reactor Supervisor cannot be trained to assure Technical Specifications are not violated during reactor operations. Furthermore, the presence of the Technical Support Engineer in the control room can weaken the line responsibility and the authority of the Senior Reactor Supervisor. We recommend that the functions of the proposed Technical Support Engineer should be assigned to the duties and responsibilities of the degreed Certified Reactor Supervisor.

Reactivity Control System

A reliable reactivity control system is essential for the safe operation of any reactor. The control systems at the Savannah River reactors have exhibited a number of deficiencies over the last several years. Incidents during the F-reactor restart in August demonstrated some of these deficiencies and recent operations have shown control rods can mechanically lock together. DuPont maintenance strategy is to inspect about one-third of the control rod drive mechanisms. Current restart plans require only assuring control rods and their drive mechanisms are latched. The Committee believes a thorough verification of the status of the entire control rod system is essential prior to restart. The verification should include inspection and maintenance of all of the motor packs, synchro-transformers, and T-amplifiers, as well as examination to assure adequacy of the latching mechanisms.

Seismic

The Committee has had difficulty getting a clear description of the status of the seismic program, primarily due to the major review being done by the DOE. The following are our initial comments. We will provide additional comments after further review.

The Seismic Resistance Issue in the Restart Strategy appears to be narrowly focused, does not indicate what must be completed before restart and tends to weaken the defense-in-depth philosophy. The Seismic Resistance criterion requires the capability to shutdown, cool and monitor core status for a design basis earthquake (0.2 g), but it is not stated whether or not this needs to be completed before start-up. No attention is given to the engineered safety features (ESFs) with respect to seismic criteria. Seismic criteria for the confinement system and the ECS system were not included because neither is considered to be a "primary safety system". Crucial instruments are to be seismically qualified, but the instrumentation system (wiring, sensors, etc.) is neglected.

Although the seismic criteria are stated in terms of a discrete number (so many g's of acceleration), a spectrum of seismic events and a spectrum of seismic response exists for each system. Second line (e.g. (ESF) systems provide the defense-in-depth in the so called "tails" section of these spectra. Consequently, the DOE should include the second line (ESF's) in the seismic criteria for restart. To insure the defense in depth philosophy, a broad approach should be taken. We recommend that the ECS and confinement systems be seismically upgraded prior to restart. On an interim basis, consideration should be given to different levels of seismic criteria for different systems, consistent with the overall safety philosophy. For example, a specific objective of returning these ESF's to their original design base of 0.1 g should be considered prior to restart, with a longer term goal of 0.2 g consistent with the new seismic design basis. Using the proposed Safety Objective Policy as a guide, a rationale should be developed for deciding which upgrades are of immediate concern, which can be delayed until after restart and for how long. It is important to make explicit the reasons for requiring that a specific set of criteria are to be met, and for allowing others not to be met until later.

Ultrasonic Testing

The reactor coolant systems of the SR reactors, including the reactor vessels, are susceptible to stress corrosion cracking. Indeed, stress corrosion cracking has been observed in the piping systems of the reactors and was responsible for the retirement of the C reactor. Frequent inspection of the reactor vessels and the reactor piping system is an essential component of the strategy developed by DuPont to deal with the hazard of cracking. DuPont has developed a state-of-the-art ultrasonic crack detection capability to augment visual inspections of the vessels for stress corrosion cracking. However, the Restart Strategy does not require the use of the ultrasonic inspection capability prior to restart of the K reactor. This omission of thorough ultrasonic and visual inspections of the piping and vessels for

cracks should be explained and justified. The need for such inspections has recently been made more obvious by evidence that inspections in the past may not have included all critical regions of the reactor coolant system susceptible to stress corrosion cracking.

Configuration Verification

Configuration management is an important element of reactor safety. System drawings must be representative of the existing plant and the plant design must be supported by safety analyses. In the seismic walkdowns performed for the P reactor, a number of discrepancies were observed between drawings and the actual condition of the plant. Conversely, the L reactor walkdowns did not identify many discrepancies. Thus, it is clear that substantial differences in configuration control exist between plants.

We suspect that major differences could also exist among different systems within a plant. Over the lifetime of these plants many changes have occurred at different time periods. The ECS system, for example, has experienced a number of backfits. The degree of configuration management exercised at these different periods may have varied. The Committee does not accept the assumption that a small sample of key safety systems can be considered representative of the safety systems in the plant as a whole for the verification of the plant condition. The Committee has no confidence that the Restart Strategy plan to sample five systems would identify a problem, if it exists. Furthermore, in our discussions with DOE and contractor staff, it was not clear how the sample results would be used quantitatively. For example, would one discrepancy be enough to indicate a problem which required fallback to a different strategy? The Committee believes that confirmation and documentation of the existing configuration of the plant are basic to safe operation. We see no acceptable alternative to a complete walkdown of the plant.

Quality Assurance

Consistent with basic safety principles for nuclear power plants, quality assurance (QA) is applied throughout activities at a nuclear power plant as part of a comprehensive system to ensure with high confidence that items delivered or services and tasks performed meet specified requirements. The Committee is concerned that DOE and its contractor have not yet established a comprehensive and integrated QA plan that would encompass the management controls and verification actions needed to ensure safety of equipment and processes associated with reactor restart. Quality assurance elements are fragmented throughout the management systems and practices listed in the Restart

Strategy document, with significant deficiencies in the identified QA elements and in the organizational structure needed for their effective implementation.

The Committee believes that a comprehensive and integrated SRO and Westinghouse QA plan should be developed and in place prior to reactor restart. The Committee recommends that DOE request Westinghouse to review and evaluate the QA plan, to perform a baseline assessment of the state of quality of the plant and its extent of verification, and to determine needs for continuing improvements. Technically-oriented self assessments should be an integral part of the verification process. To accomplish these objectives, the Committee recommends that DOE and Westinghouse ensure that the proper organizational framework is operating, with well-defined lines of responsibility, authorities, and communication for achievement and verification of quality.

CONCLUDING COMMENTS

Finally, the Committee has two general observations which go beyond the restart strategy document. We have been involved in review of SRP since June, and we expressed our initial concerns in our letter to you of August 15, 1988. Subsequently we reviewed the August events and since then have followed with interest and concern the many critical reviews. We conclude that the effort required to meet the Restart Strategy precludes an early restart, and we endorse your recent statement that the plant will not operate until at least next spring or summer. Substantial resources will be required to implement DOE's plans, and hard as it may be to obtain additional funds, competent people are in even shorter supply. Therefore, we recommend that the Department focus all available resources on restarting the first reactor, with subsequent action on the other two. We also recommend the earliest possible involvement of Westinghouse personnel, since they will be the responsible contractor when the reactor(s) restart.

We have not addressed training in detail in our response. Other actions must be implemented before training can incorporate improved practices and clear operating conditions. Changing attitudes will take time, and changing attitudes are critical to a sound restart program. The Committee will continue to follow the restart program and will provide our comments on the training program once the details have been developed and provided to us.

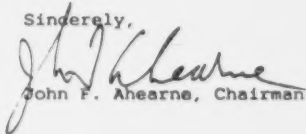
We also have not addressed radiation protection, although Committee members, staff and consultants have identified radiation protection weaknesses at SRP, particularly in contamination control. Many times over the years of SRP operation, radiological contamination has occurred and not been detected promptly, leading us to a preliminary conclusion that

Savannah River needs improvement to meet the standards of good industry practice. The Committee will examine this issue further and provide you with our comments.

We are unable to advise whether the Restart Strategy will meet "the long and short term safety objectives", as required by Assistant Secretary Baynard. Put another way, at this time we are unable to advise whether the SR plants will meet the overall safety criteria of adequate protection to the public and the workers. As the program becomes clearer, the implementation schedule defined and progress made toward meeting the acceptance criteria, we will provide our advice on this major question. The Restart Strategy document is only an initial step.

We hope this report will be of use to you and your staff in implementing the actions necessary at the Savannah River plant for the return of the reactor(s) to service.

Sincerely,


John F. Ahearne, Chairman

Advisory Committee on Nuclear Facility Safety

to the
United States Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

January 13, 1989

Honorable John S. Herrington
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Secretary:

As requested by Assistant Secretary Baynard, we have provided comments on several versions of the draft DOE Safety Policy, and on some proposed attachments. The latest version reviewed is that of (October 27, 1988), which included one attachment, "(Safety Elements)". Our previous comments were considered by the Department and many are incorporated into this version.

The current draft includes several sound, broad policies. Whether this Safety Policy will be of help depends on two additional steps:

- (1) Acceptance of the policy throughout the Department as guidelines for practice, and
- (2) Prompt issuance of implementation guidelines which are promised.

At the present time, the package is incomplete without the supporting documents.

In a similar vein we would like to see these broad principles implemented as a guide, for example, in the Savannah River restart program. The restart program is an obvious candidate for application of the principles developed in the safety policy. Application to the restart program will demonstrate a commitment to the policy. However, in doing so, the Department must progress thoughtfully. Many steps must be taken and objectives met before any of the SRP reactors can be restarted. Yet there does not seem to be a coherent expression of the level of safety toward which all these actions are directed. It is therefore difficult, perhaps in principle impossible, to judge whether the actions are enough, or even too much. It is for this reason that the use of the policy as a guide might be helpful.

Although not necessarily applicable to the draft policy per se, a few additional comments illuminate our view as to how the policy should be implemented.

There appear to be several options in implementing the policies of the Department for the safe operation of reactors:

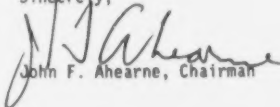
- (1) Aim for a level of safety comparable to that achieved in the commercial reactors. One should obviously not try to duplicate the mass of regulations, guides, positions, and understandings that make up the commercial environment, but could still aim for a comparable level of safety. The problem would then be one of developing a practical strategy for measuring progress toward that end.
- (2) Use the safety principles developed by the IAEA for commercial plants, recognizing that these are, while largely unexceptionable, a bit vague and discursive. Since they represent agreement among many nations, this is hardly surprising.
- (3) Set quantitative standards, and enforce them through probabilistic risk assessment. The Nuclear Regulatory Commission (NRC) has devoted ten years to developing this approach. After many years of debate inside and outside of the Commission, the NRC has not completed the implementation of this approach. In view of the experience of the NRC, we recommend that the Department not use this approach as the sole approach, and certainly not as the near-term approach.

We believe that the most promising approach for the Department to use now is to aim at approximate parity with the commercial safety level, but without duplication of the vast set of rules. The current draft policy could be of substantial assistance in providing a framework for the near term and for developing the long-term safety policy. The best (perhaps the only) way to assure meeting this goal in the near-term is to depend heavily on the judgment and expertise of people who understand the commercial experience and its relevance to safety levels, in sufficient depth to bring that wisdom to the service of DOE. While necessarily subjective, this approach has the best chance of bringing closure of current safety issues in a reasonable time.

Attached are specific comments.

We hope our review will be of assistance.

Sincerely,


John F. Ahearne, Chairman

We believe the current draft attachment should be strengthened in its treatment of quality assurance. We recommend the following (additions are underlined):

3.0 QUALITY ASSURANCE

A comprehensive quality assurance program, based on the requirements of ANSI/ASME NQA-1, for the design, safety assessments, construction, testing, operation, maintenance, modification and refueling of nuclear facilities is to be provided, to ensure the safety of the public and of the personnel, equipment and processes associated with these facilities.

This Quality Assurance program is to be most intensive in application to facility components and systems having greatest importance for risks. It is to be structured in conformity with the principle that responsibility for achieving and verifying quality rests with those performing the task with provision for independent verification such as by audit or assessment by appropriate organizational elements. A specific quality assurance program plan or description for each facility must be in place prior to implementation of activities affecting the quality of components and systems. This plan or description must provide for explicit practices and procedures for achieving and verifying quality in performing specific tasks.

DEFENSE WASTE CLEANUP:

**A PROPOSAL FOR
A NATIONAL SOLUTION**

**GOVERNOR BOOTH GARDNER
STATE OF WASHINGTON**

**GOVERNOR NEIL GOLDSCHMIDT
STATE OF OREGON**

NOVEMBER 30, 1988

I. Introduction

Over the past 45 years, the United States has developed, produced and tested nuclear weapons at sites in 12 states. During this period, massive quantities of radioactive and chemical wastes have been allowed to accumulate at these sites, including Washington's Hanford Reservation. Some past disposal practices were inadequate. Aging "temporary" storage facilities have failed. As a result, these wastes now threaten the environment and the public health and safety.

As the Governors of Oregon and Washington, we have joined forces to stave off that threat. We are pursuing the retrieval, safe cleanup and permanent disposal of Hanford's radioactive and chemical wastes. Our goal is to achieve this cleanup within 30 years.

The defense waste problem is more than an important Northwest issue. It is a national problem. It involves U.S. Department of Energy (USDOE) defense facilities in 12 other states. We strongly believe that the long-term answer to Hanford's problems ultimately lies in a national effort to clean up all USDOE defense facilities.

Accordingly, we are calling for prompt and decisive action by Congress to enact legislation which will create an effective, long-term cleanup program. It must cover the cleanup and permanent disposal of radioactive and chemical wastes at Hanford and other USDOE defense facilities.

II. The Need for a National Cleanup Program

Recent reports by USDOE and the General Accounting Office (GAO) document serious waste and contamination problems at virtually every USDOE defense facility. Cases of extensive soil and groundwater contamination are common. In some cases, groundwater contamination is thousands of times above federal drinking water standards. At two installations, soil contamination levels hundreds to thousands times that of background levels have been reported. Further, the full extent of contamination at USDOE facilities remains unknown. New problems continue to come to light.

In July 1988, USDOE told Congress that defense waste cleanup could cost as much as \$110 billion over the next 50 years. The GAO feels the cost may be as high as \$130 billion. Despite these cost estimates, only about \$975 million was appropriated in FY 1989. And, the major portion of these funds is for continued management of waste in temporary storage -- and not for cleanup and permanent disposal.

USDOE has made progress in starting cleanup at a number of facilities, including Hanford. But, it remains uncertain whether this work will be completed before serious and permanent harm is done. There is no firm federal commitment to the cleanup. Schedules have slipped repeatedly. USDOE has no milestones or deadlines for completing cleanup work. Funding is far less than needed. Application and enforcement of federal and state laws and regulations are uncertain. The role of affected states and tribes is not clear. Public confidence in USDOE's ability to handle these wastes safely has seriously eroded.

The longer cleanup is delayed, the more costly and dangerous it will be. Hundreds of millions of dollars will continue to be spent on temporary storage. Aging storage facilities will continue to fail. Waste forms now stable may not remain so. Wastes will continue to spread through the environment, contaminating more soil and water.

The time has come for the federal government to solve the waste problem at Hanford and the other USDOE sites. It is time for a firm and substantive federal commitment. These wastes have been produced as part of the nation's defense programs. Their cleanup and disposal are a national obligation.

The magnitude of waste cleanup and disposal problems dictates the need for a national effort to clean up all USDOE sites. A credible cleanup program must ensure that radioactive and chemical wastes are kept away from people for as long as the wastes are dangerous. The program must include:

1. A detailed schedule;
2. Sufficient funding;
3. An effective regulatory structure;
4. The means to build and maintain public confidence; and
5. The development of advanced technologies to ensure safe, thorough and cost effective waste cleanup and disposal.

III. Key Elements of a National Program

Congress must take action now to ensure the safe and expeditious cleanup of radioactive, hazardous, and mixed wastes at all USDOE facilities. The program must address these points:

A. Schedule for Cleanup

There must be a firm commitment to complete the cleanup and disposal within a reasonable and specified period of time. In 1983, USDOE proposed the cleanup of radioactive wastes at Hanford, the Savannah River plant, and the Idaho National Engineering Laboratory within 30 years. Now USDOE hints it will take 50 to 60 years to complete the cleanup.

Without a firm schedule, there is no assurance that the critical cleanup work will be completed in a timely manner -- if at all. Without a schedule, there is no means by which to rank priorities, measure performance, determine funding needs, or allocate resources.

The program must set firm milestones and deadlines to complete the cleanup. Federal environmental laws provide a precedent for setting a compliance deadline. We feel that a commitment to clean up all USDOE facilities within 30 years is both essential and achievable.

The program must also include a national priority system. That system must ensure that the wastes that pose the greatest public and environmental risks are handled first. It must ensure the prompt elimination of immediate threats. It must also ensure the cleanup and disposal of any other wastes before the public and environment is put at risk. The system must consider people at risk, environmental factors, and the nature and volume of wastes. It must also take into account the complexities of cleanup and the costs of deferring action.

The program must provide for the schedule adjustments needed to deal with unforeseen problems. USDOE must work with federal and state regulatory agencies to prepare and implement detailed work plans. The plans must be consistent with national priorities and deadlines. USDOE should have the flexibility to adjust schedules and reallocate resources, so long as such action will not extend cleanup work beyond the deadline. USDOE should keep Congress fully apprised of its progress and any major changes in work schedules and plans.

B. Funding

The program must be able to assure adequate and long-term funding for waste cleanup and disposal. An effective cleanup program will require a Congressional commitment to substantially increase funding levels for cleanup.

A trust fund to finance cleanup and disposal work should be considered. Direct appropriations to the fund should be sufficient to ensure the cleanup of existing wastes by the deadlines set by Congress. The proper handling, storage and disposal of wastes generated in the future should be on a "pay-as-you-go" basis. Agencies responsible for the wastes should be required to make annual payments to the trust fund.

Payments to the fund must be sufficient to cover USDOE cleanup costs. The payments must also cover costs incurred by the U.S. Environmental Protection Agency (EPA) and the affected states and Indian tribes. The distribution of trust funds must be based on national cleanup priorities and on work schedules for completing cleanup activities by the established deadline.

C. Compliance with Federal and State Regulations

For over 40 years, waste handling, storage, and disposal have been largely exempt from any independent oversight. In a number of instances, poor waste management and disposal practices have knowingly been tolerated. These practices have contributed significantly to waste cleanup and contamination problems. USDOE has acknowledged these past problems. It has stated that it will comply with state and federal regulations in the future. But, the situation remains uncertain at best.

The federal government has actively challenged the application and enforcement of state Resource Conservation and Recovery Act (RCRA) programs at Colorado's Rocky Mountain Arsenal and USDOE facilities. States have been forced to

constantly defend their regulatory authority and their interest in ensuring an effective cleanup of hazardous wastes at federal facilities. USDOE also continues to challenge EPA's authority to enforce federal regulations and standards. These challenges raise grave doubts that the federal government will effectively regulate itself.

The program must set up a clear regulatory framework for the cleanup. State and federal regulatory programs are key to an effective and credible cleanup process. These regulatory programs are intended to provide the independent authority needed to ensure that waste problems are fully evaluated and that corrective actions are both timely and appropriate.

The program must direct that all cleanup and disposal work strictly comply with applicable federal and state laws and regulations. EPA must be given the clear authority and direction to issue orders and enforce compliance with approved cleanup plans and schedules.

The role of state regulators must also be strengthened. This is especially true where a state has authority to implement federal laws such as RCRA. The implementation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at USDOE facilities must not supercede or replace the implementation of RCRA for active hazardous and mixed waste sites. The states must have the clear authority to implement and enforce RCRA-based hazardous waste laws at federal facilities. Likewise, the program must uphold a state's delegated authority to implement and enforce other federal environmental regulations.

Finally, since federal and state regulatory programs are critical parts of the cleanup process, the program must ensure that both EPA and the states have adequate funding for regulatory functions.

D. Public Confidence

The magnitude, history, and nature of the nuclear weapons waste problems make public confidence and acceptance crucial to cleanup success. The public must be fully aware of the problems. People must be convinced that cleanup solutions will ensure a safe and healthy environment.

To win public confidence, the decision-making and review processes must be open to the public. People must have the opportunity to understand the issues. They must have the chance to influence decisions relating to cleanup, transportation, and disposal of wastes.

In this effort, the affected states and Indian tribes should play a key role in public involvement and education programs. The cleanup program must provide for and fund state and tribal activities such as:

1. Technical review of cleanup plans and methods;

2. Transportation planning and emergency response;
3. Environmental monitoring of waste sites and cleanup activities; and
4. Public information and involvement programs.

E. Development of Cleanup Technology

The diversity of environmental conditions, coupled with the variety of waste forms, types, and volumes found at USDOE sites presents a formidable challenge to an effective cleanup program. We need to ensure the safest, most thorough and cost efficient cleanup and disposal effort possible. We must not limit our options solely to technology currently available. The program must provide for the continuing research and development of advanced cleanup and disposal technology.

IV. Conclusion

For decades, radioactive and hazardous chemical wastes have been allowed to accumulate at USDOE defense facilities across the nation, including Washington's Hanford Reservation. Today, as the result of inadequate past disposal practices and failing temporary storage facilities, these wastes pose a serious threat to the public safety and the environment.

While USDOE has begun to acknowledge and correct the problems posed by the wastes, the future is uncertain. The cleanup and disposal of wastes will cost billions of dollars and require decades to complete. Yet, no firm schedule exists and funding lags far behind requirements for an effective cleanup effort.

If we are to ensure a safe and healthy environment for the citizens of the Northwest and the nation, decisive action is essential. It is time for the federal government to fulfill its obligation to ensure the safe and permanent disposal of these wastes. We urge Congress to act quickly in establishing an effective and credible cleanup program for USDOE facilities.

**ENVIRONMENTAL CLEANUP
OF
U.S. DEPARTMENT OF ENERGY
DEFENSE PRODUCTION FACILITIES**

**Summary Statement of
Governor Booth Gardner
State of Washington**

**Before The
U.S. Senate Committee on
Governmental Affairs**

January 26, 1989

The Hanford Reservation has a long and important history in Washington State. It has produced nuclear weapon materials for this Nation's defense, it has served as a center for energy research and development, and it has supported a vigorous local economy.

In the last ten years, however, its role has undergone tumultuous change. For a time it was a candidate for designation as the nation's first commercial nuclear waste repository; then it was taken off the list. The plants which produced and refined plutonium and uranium for the weapons program were abruptly put on "cold standby". The permanent curtailment of defense production activities proposed in the Department of Energy's "2010 Report", has shaken local communities. Recent reports of past radioactive releases have cut deeply into the Department's credibility.

In response, the state of Washington has initiated a range of efforts designed to produce a Hanford Reservation which is safer, cleaner, and economically stronger.

In order to cushion the blow to the people of the neighboring TriCities, we have concentrated the services state government can provide. We have cooperated with the contractors and the Department for job placement and training.

In response to the economic problems, we have embarked on two paths; one is to diversify the narrow economic base of the area by attracting new businesses whose cycles are independent of nuclear defense spending, including a national center for molecular science. The other is to support appropriate traditional missions at the Reservation, notably continued operation of the Fast Flux Test Facility.

We have also initiated efforts to make sure that Hanford's future will be environmentally safe and clean. Our principal efforts in this regard are the thorough and expeditious cleanup of the defense wastes at Hanford.

The scope of the problems facing the nuclear weapons complex is staggering, and so are the implications for public health and safety. The Hanford Reservation alone faces the monumental task of cleaning up deadly chemical and radioactive wastes accumulated over the past four decades. By volume, Hanford has far more waste than any other Department of Energy defense facility, including:

- 62% of the high-level radioactive wastes.
- 57% of the buried transuranic (plutonium-contaminated) wastes
- 22% of the buried low-level waste

While no serious offsite contamination has occurred to date, Hanford's wastes pose a grave long-term threat to the people and the environment of the Pacific Northwest. Nearly 70,000 people use ground and surface waters within 3 miles of Hanford for drinking and irrigation. The Columbia River is a key Northwest waterway. It supplies drinking water and supports agricultural irrigation, fisheries, commercial transportation, power generation, tourism, and industrial processes. Contamination of these critical water resources could have devastating effects on the region's economy and population.

As extensive and potentially disastrous as Hanford's waste problems are, they are only part of a much larger national problem. Department of Energy reports submitted to this Committee over the past year document serious waste problems at nearly every weapons production site. Years of neglect have allowed these problems to grow until, today, we are faced with an unprecedented environmental crisis which will require billions of dollars and decades to correct.

The problem is national in scope and magnitude, and so must be the solution. Our goal must be to keep these chemical and radioactive wastes away from people for as long as they are dangerous. The answer lies in an effective national effort to clean up Hanford and the other Department of Energy defense facilities. That effort must include:

1. A firm commitment to a definitive cleanup schedule and a process for setting national cleanup priorities;
2. Measures to ensure sufficient long-term funding to support cleanup, transport and disposal work;
3. Assurances that the cleanup, transport and disposal will be accomplished in strict compliance with state and federal laws and regulations and that state and federal regulators will have the enforcement authority necessary to ensure such compliance;
4. A substantive, federally-funded role for the states in the cleanup process, including technical oversight, policy review and formulation, transportation planning and emergency response, and public information and education; and
5. A commitment to expand research and development of new, more effective cleanup technologies.

If we are to ensure a safe and healthy environment for the citizens of the Northwest and the Nation, decisive action is essential. The problem is one of national scope and magnitude. Its solution must be a national priority. I will forward to the Committee a more detailed discussion of a national solution which Governor Goldschmidt of Oregon and I developed. I will also submit for your record a more extensive set of remarks. I look forward to working with the committee as it continues its work on this vital issue.

January 25, 1989

The President
The White House
Washington, D.C. 20500

Mr. President:

Over the past four decades, the United States has developed, produced, and tested nuclear weapons using a network of facilities located in thirteen states. Today, the vast quantities of radioactive and toxic chemical wastes which have accumulated at these sites pose both immediate and long-term threats to the public health and safety and the environment. Recent weeks have seen an alarming rise in the reports of serious waste management and contamination problems at these facilities. Inadequate past waste disposal practices and failing "temporary" storage facilities have resulted in serious onsite contamination problems at virtually every U.S. Department of Energy (USDOE) defense and research facility. At several facilities operational practices have resulted in significant offsite contamination.

The scope and severity of these problems demand immediate and decisive action. While USDOE has begun to recognize the critical problems posed by past operations, too little is being done to prevent further permanent damage. The U.S. General Accounting Office has estimated a national cleanup will cost \$130 billion, but less than 1% of this amount was appropriated for waste management and disposal at USDOE facilities in FY 1989. Most of the meager appropriation received is dedicated to pay for continued waste handling and temporary storage -- and not permanent cleanup and disposal.

As Governors of the States most affected, we implore you to take the initiative in working with Congress to establish cleanup as a national imperative. An effective cleanup program will require your willingness to work with Congress to make environmental, safety and health concerns as much a part of USDOE's agenda as production. As an urgent critical first step in this process, we urge you to include substantially increased funding for waste cleanup and disposal work at USDOE facilities in your FY 1990 budget proposal. We also request that you make the resolution of transuranic waste disposal problems an important priority in the first months of your administration.

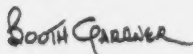
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In addition to these immediate priorities, we would like to work closely with your administration and the Congress to establish a credible long-term cleanup program for USDOE defense and research facilities. We feel that such a program must provide:

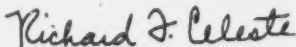
1. A detailed plan and schedule for completing cleanup in the most timely manner possible;
2. A method for assuring adequate long-term funding;
3. An effective regulatory structure;
4. The means to restore public confidence in the ability to safely handle and dispose of wastes, including the designation of an independent body to review and oversee cleanup work; and
5. The development of advanced technologies to ensure safe, thorough and cost efficient waste cleanup and disposal.

Decisive federal action to defuse these potentially catastrophic situations is long overdue. The gravity of these problems will only increase with time. Contamination will spread. Cleanup will be more costly and dangerous. The risk to the public will increase. We are anxious to work with you and the 101st Congress to accomplish this important national goal -- and to ensure a safe and healthy environment for our people.

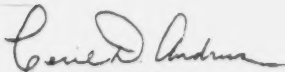
Sincerely,



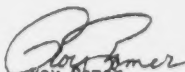
Booth Gardner
Governor of Washington



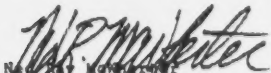
Richard F. Celeste
Governor of Ohio



Cecil D. Andrus
Governor of Idaho



Roy Romer
Governor of Colorado



Ned Ray McWhorter
Governor of Tennessee



Robert J. Miller
Governor of Nevada

STATEMENT BY
THE HONORABLE CARROLL A. CAMPBELL, JR.
GOVERNOR, STATE OF SOUTH CAROLINA
BEFORE THE SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS
JANUARY 26, 1989

MR. CHAIRMAN, SENATORS, I APPRECIATE THE OPPORTUNITY TO PRESENT MY STATEMENT CONCERNING WASTE CLEANUP AND ENVIRONMENTAL PROGRAMS AT NUCLEAR DEFENSE PRODUCTION FACILITIES IN SOUTH CAROLINA.

AS YOU KNOW, THE UNITED STATES GOVERNMENT OWNS A THREE HUNDRED SQUARE MILE FACILITY IN SOUTHWESTERN SOUTH CAROLINA KNOWN AS THE SAVANNAH RIVER PLANT. BEGINNING IN THE EARLY 1950's, NUCLEAR PRODUCTION REACTORS AND SUPPORT FACILITIES WERE PLACED ON LINE IN A RACE AGAINST THE RUSSIANS TO MAINTAIN A SUPERIORITY IN NUCLEAR WEAPONS AFTER WORLD WAR II AND CONTINUING THROUGH THE KOREAN CONFLICT. AS NUCLEAR WEAPONS WERE A RELATIVELY NEW INVENTION, INTERNATIONAL COMPETITION AMONG SUPER POWERS WAS GEARED TOWARDS THE ABILITY TO DEVELOP THE BOMB. STRICT SECURITY MEASURES WERE THEREFORE TAKEN BY THE UNITED STATES GOVERNMENT TO PREVENT SECURITY BREACHES AND TO ISOLATE THEIR ACTIVITIES FROM THE OUTSIDE WORLD.

DURING THIS TIME, INDUSTRY PRACTICES WITH REGARD TO THE DISPOSAL OF RADIOACTIVE AND HAZARDOUS MATERIALS COULD BE TERMED CRUDE AT BEST BY TODAY'S STANDARDS. OUT OF SIGHT

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WAS OUT OF MIND. MANY PEOPLE CALLED UPON THE GOVERNMENT TO SEND THIS WASTE INTO OUTER SPACE OR DUMP IN INTO THE OCEAN. THANKFULLY, THIS DID NOT OCCUR. YET, SEEPAGE BASINS WERE COMMONLY USED FOR THE DISPOSAL OF RADIOACTIVE AND HAZARDOUS MATERIALS. LOW-LEVEL RADIOACTIVE WASTE AT TIMES WAS PLACED IN CARDBOARD BOXES AND BURIED IN LANDFILLS.

THE FEVER FOR PRODUCTION OF NUCLEAR MATERIALS DURING THIS TIME DID NOT JEOPARDIZE THE IMMEDIATE HUMAN HEALTH AND SAFETY OF EMPLOYEES AT THE PLANT OR CITIZENS OFF-SITE. THE RECORD IS CLEAR THAT THE DUPONT COMPANY IN ITS 38 YEARS OF MANAGING THE SAVANNAH RIVER FACILITY NEVER SUFFERED A LOSS TIME INJURY DUE TO RADIATION EXPOSURE. THERE REMAINS, HOWEVER, THE FACT THAT THERE HAVE BEEN ACCUMULATIONS OF RADIOACTIVE AND CHEMICAL WASTES LEFT OVER AT THE SAVANNAH RIVER PLANT.

OUR TECHNOLOGY AND PERSPECTIVE ON ENVIRONMENTAL INTEGRITY HAVE NOW REACHED THE POINT WHERE WE UNDERSTAND HOW TO PRODUCE NUCLEAR WEAPONS MATERIALS IN AN ENVIRONMENTALLY ACCEPTABLE MANNER. I BELIEVE WE HAVE TURNED THE CORNER AND SEEN THE ROAD WE NEED TO TAKE TOWARDS IMPLEMENTING AND ALLOCATING OUR RESOURCES FOR THE CLEANUP OF EXISTING CONTAMINANTS. WE NEED TO ASSURE THE PUBLIC THROUGH THE CONGRESS THAT THE DEPARTMENT OF

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ENERGY'S CREDIBILITY AND ITS ATTITUDE TOWARDS PUBLIC AND EMPLOYEE SAFETY WILL ALWAYS BE FOREMOST ABOVE PRODUCTION SCHEDULES. THE RESTORATION OF PUBLIC TRUST IS A MUST FOR OUR DEFENSE PRODUCTION FACILITIES LOCATED THROUGHOUT THE COUNTRY. I COMMEND SENATOR GLENN AND OTHER CONGRESSIONAL LEADERS WHO REALIZED THIS NECESSITY BY ENACTING LEGISLATION LAST YEAR ESTABLISHING A SAFETY ADVISORY BOARD FOR NUCLEAR DEFENSE FACILITIES.

THE NATIONAL AWARENESS OF PROBLEMS ASSOCIATED WITH DEFENSE PRODUCTION REACTORS THROUGHOUT OUR COUNTRY HAS BROUGHT TO A HEAD THE DEMAND FOR INCREASED FUNDING FOR CLEANUP AT ALL SITES. WE HAVE THE TECHNOLOGY FOR CLEANUP AND WASTE DISPOSAL. IT IS EXPENSIVE, BUT ABSOLUTELY NECESSARY. WE ARE FORTUNATE AT SAVANNAH RIVER THAT WE HAVE CHARACTERIZED THE WASTE ON SITE AND ALL THE WASTE REMAINS ON SITE. WE KNOW WHERE IT IS; WE KNOW WHAT IT IS; AND NOW WE ONLY NEED TO ESTABLISH A FIRM SCHEDULE FOR CLEANUP AND THE NECESSARY OVERSIGHT FOR REMEDIAL ACTION. THIS COMMITTEE AND THE CONGRESS MAY WISH TO CONSIDER EARMARKING CLEANUP FUNDS WITHIN THE DEPARTMENT OF ENERGY BUDGET IN A "SUPERFUND" LIKE MECHANISM TO ENSURE THE FUTURE AVAILABILITY OF FUNDS.

AS YOU KNOW, I STRONGLY SUPPORTED THE SITING OF THE NEW PRODUCTION REACTOR AT SAVANNAH RIVER. IN APRIL, 1988, THE GOVERNOR'S NUCLEAR ADVISORY COUNCIL SUBMITTED A REPORT

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TO ME, THE SOUTH CAROLINA GENERAL ASSEMBLY AND THE JOINT LEGISLATIVE COMMITTEE ON ENERGY ENTITLED "SAFETY ISSUES AT THE DEFENSE PRODUCTION REACTORS." THIS REPORT ADDRESSED IMPLICATIONS FOR THE STATE OF SOUTH CAROLINA RESULTING FROM THE NATIONAL ACADEMY OF SCIENCES REPORT ON DOE FACILITIES. IN THIS REPORT, THE NAC RECOMMENDED DOE CONTINUE TO VIGOROUSLY PURSUE, AND SOUTH CAROLINA SUPPORT, THE CONSTRUCTION OF A NEW PRODUCTION REACTOR AT THE SAVANNAH RIVER SITE.

WE APPRECIATE RECENT ACTION BY DOE TO MOVE TOWARD THIS GOAL. HOWEVER, WE CANNOT OVER-EMPHASIZE THE NEED TO MOVE EXPEDITIOUSLY IN THE CONSTRUCTION OF THE NPR. THE NPR WILL BE A STATE-OF-THE-ART FACILITY WITH THE MOST MODERN TECHNOLOGY AVAILABLE. IT WILL BE SAFER, MORE RELIABLE AND MORE ENVIRONMENTALLY SOUND THAN THE AGING P, K AND L REACTORS PRESENTLY AT THE SAVANNAH RIVER SITE. THE CONSTRUCTION OF THE NPR WILL LEAD TO THE PERMANENT CLOSURE OF THE EXISTING AGING REACTORS AT SRP WHILE FULFILLING THE NATIONAL DEFENSE PROGRAM'S NEEDS FOR TRITIUM. WE HAVE THE EXISTING INFRASTRUCTURE AND TRAINED WORKFORCE TO GET ON WITH THE JOB OF REPLACING THE THREE REMAINING PRODUCTION REACTORS OUR COUNTRY NEEDS FOR NATIONAL DEFENSE.

THE PROPOSED HWR-NPR WILL OFFER SAFETY FEATURES NOT CURRENTLY FOUND IN THE EXISTING REACTORS AT SAVANNAH

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RIVER, THE MOST NOTICEABLE OF WHICH IS CONTAINMENT. THE NPR WILL HAVE A LARGE CONTAINMENT SIMILAR TO COMMERCIAL PRESSURIZED WATER REACTORS. ALSO, SIGNIFICANT AMOUNTS OF TRITIUM WILL BE REMOVED FROM THE PRIMARY COOLANT DURING REACTOR OPERATIONS TO REDUCE TRITIUM RELEASES TO THE ENVIRONMENT. INCORPORATION OF THE LATEST ENVIRONMENTAL AND SAFETY TECHNOLOGIES WILL ASSURE THE GREATEST DEGREE OF PROTECTION TO THE ENVIRONMENT, PLANT WORKERS AND THE OFF-SITE PUBLIC.

THE NAC ALSO RECOMMENDED IN THE APRIL REPORT THAT DOE SHOULD COMMIT TO SAFETY CRITERIA THAT ASSURE PROTECTION OF THE PUBLIC COMPARABLE TO THAT ACHIEVED BY THE NRC, EVEN THOUGH WE RECOGNIZE DEFENSE REACTORS EMBODY SOME FUNDAMENTAL TECHNICAL AND OPERATING DIFFERENCES FROM COMMERCIAL POWER REACTORS. THE NAC RECOMMENDED THESE SAFETY CRITERIA SHOULD BE IMPLEMENTED PROMPTLY AND STRICTLY ADHERED TO WITHOUT COMPROMISING SAFETY. ADDITIONALLY, NAC RECOMMENDED SOME TYPE OF INDEPENDENT OVERSIGHT GROUP BE FORMED TO ADVISE AND MONITOR DOE FACILITIES.

THE RECENT FORMATION OF THE FEDERAL ADVISORY COMMITTEE ON NUCLEAR FACILITY SAFETY AND THE FORMATION OF AN ADDITIONAL OVERSIGHT COMMITTEE WHICH WILL REPORT TO CONGRESS ARE STEPS IN THE RIGHT DIRECTION. WE FEEL THIS IS AN ESSENTIAL PART OF ENSURING SAFETY OF THE PUBLIC.

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THE NEW PRODUCTION REACTORS WILL ALSO DOVE-TAIL WITH EXISTING NUCLEAR FACILITIES INCLUDING THE DEFENSE WASTE PROCESSING FACILITY CURRENTLY UNDER CONSTRUCTION AT A PRICE TAG OF APPROXIMATELY 1 BILLION DOLLARS. IN THE DWPF, HIGH-LEVEL WASTE PRODUCED BY DEFENSE ACTIVITIES AT THE SRP WILL BE PROCESSED INTO A SOLID FORM SUITABLE FOR PERMANENT OFF-SITE GEOLOGIC DISPOSAL. BY THE YEAR 2005, THE DWPF WILL HAVE IMMOBILIZED THE BACKLOG OF HIGH-LEVEL WASTE WHICH HAS BEEN ACCUMULATING IN STORAGE TANKS AT THE SRP SINCE 1954. CANISTERS OF THE IMMOBILIZED WASTE WILL THEN BE READY FOR PERMANENT DISPOSAL DEEP UNDER THE GROUND, SAFELY ISOLATED FROM THE ENVIRONMENT.

MORE THAN 10 YEARS OF RESEARCH AND DEVELOPMENT HAVE GONE INTO MAKING SURE THIS FACILITY IS THE SAFEST POSSIBLE FACILITY. AN ENVIRONMENTAL IMPACT STATEMENT WAS PREPARED IN 1982, AND REVIEWED BY 14 PRIVATE ORGANIZATIONS, 10 GOVERNMENT AGENCIES AND THE ENVIRONMENTAL PROTECTION AGENCY. THEIR CONCLUSIONS WERE THAT THE OPERATION OF THE DWPF WOULD HAVE NO EFFECT ON THE LEVEL OF RADIATION IN THE AREA SURROUNDING THE SRP. THE OPERATION OF THIS FACILITY IS ESSENTIAL IN THE OVERALL PLAN TO CLEAN UP EXISTING FACILITIES AT THE SAVANNAH RIVER SITE. ONCE VITRIFIED, THESE HIGH-LEVEL WASTES WILL BE SHIPPED TO THE PERMANENT REPOSITORY FOR LONG-TERM, SAFE INTERMENT, AND I ENCOURAGE THIS COMMITTEE TO PROCEED

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DILIGENTLY WITH THE NUCLEAR REGULATORY COMMISSION IN ASSURING THE PUBLIC THAT A PERMANENT REPOSITORY FOR HIGH-LEVEL RADIOACTIVE WASTE COMES ON LINE AS SOON AS POSSIBLE.

ANOTHER ASPECT I WOULD LIKE TO ADDRESS BEFORE THE COMMITTEE TODAY IS THAT OF ADEQUATE FUNDING FOR MAINTENANCE AND ENVIRONMENTAL CLEANUP AT SAVANNAH RIVER. THE MAINTENANCE AND CLEANUP OF EXISTING FACILITIES AND THE ENVIRONMENT AT SRP IS NOT A TECHNOLOGICAL PROBLEM; IT IS A PROBLEM OF ADEQUATE FUNDING. WITH THE BUDGET CONSTRAINTS PLACED ON THE CONGRESS, THERE WILL BE TREMENDOUS COMPETITION FOR SECURING ADEQUATE FUNDING FOR NEEDED PROGRAMS. I BELIEVE IT IS IMPERATIVE UPON THE CONGRESS AND THIS COMMITTEE TO PRIORITIZE CLEANUP AT EXISTING FACILITIES IN SUCH A MANNER AS TO ASSURE TIMELINESS OF CONTRACTS WHICH CAN BE LET TO ACTUALLY PERFORM THE NECESSARY CLEANUP AND MAINTENANCE ACTIVITIES. THROUGHOUT MANY ADMINISTRATIONS, THERE HAS BEEN THE LACK OF ADEQUATE FUNDING TO KEEP THE PRODUCTION REACTORS IN THE MOST STATE-OF-THE-ART CONDITION AS POSSIBLE. WITHOUT MODERNIZATION, THE MACHINERY AND REACTORS WHICH WERE DESIGNED FOR 25 YEARS OF USEFUL LIFE HAVE FOUND THEMSELVES PRESSED INTO OVER 35 YEARS OF SERVICE. THE LACK OF ADEQUATE FUNDING HAS ALLOWED THE REACTORS TO DETERIORATE AND WE HAVE FOUND OURSELVES AT SAVANNAH RIVER OPERATING REACTORS AT REDUCED POWER FOR

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FEAR OF REACTOR SAFETY. AS AN EXAMPLE, THE SAVANNAH RIVER DEFENSE WASTE AND THE ENVIRONMENTAL RESTORATION PROGRAM IN FISCAL YEAR 1989 HAS A FUNDING LEVEL OF 23 MILLION DOLLARS. IN FISCAL YEAR 1990, THIS WILL DOUBLE TO THE AMOUNT OF 56 MILLION DOLLARS AND WILL INCLUDE CLOSURE AND THE CLEANUP OF INACTIVE RCRA AND SURPLUS SITES WITH THE MAJOR ELEMENTS CONSISTING OF DECOMMISSIONING OF THE A, F, AND H AREA SEEPAGE BASINS, THE LOW-LEVEL RADIOACTIVE WASTE BURIAL GROUND DECOMMISSIONING, AND THE HIGH-LEVEL LIQUID WASTE TANK FARM DECOMMISSIONING.

MY FIRST OBSERVATION AND QUESTION WOULD BE WHETHER OR NOT THE PROPOSED FUNDING LEVELS ARE ADEQUATE TO ADDRESS THE ENVIRONMENTAL NEEDS AT THE SITE. SECONDLY, IT HAS BEEN MY OBSERVATION THAT FUNDING FOR ENVIRONMENTAL CLEANUP PROGRAMS HAVE HAD NO INDEPENDENT OVERSIGHT AND I WOULD STRONGLY SUGGEST STATE OVERSIGHT FOR THE DEPARTMENT OF ENERGY'S BUDGET AND PRIORITIZING CLEANUP EFFORTS AT NOT ONLY THE SAVANNAH RIVER PLANT BUT OTHER NUCLEAR WEAPONS FACILITIES IN THE COUNTRY.

IN CLOSING, I BELIEVE THE CONGRESS AND THE DEPARTMENT OF ENERGY HAVE FELT THE HEARTBEAT OF THE AMERICAN PUBLIC ON THE EMOTIONALLY CHARGED AND SENSITIVE ISSUE OF NUCLEAR WASTE. I BELIEVE THE FEDERAL GOVERNMENT IS EVOLVING INTO A PARTNERSHIP WITH THE STATES AND, IN PARTICULAR, I BELIEVE

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January 26, 1989

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SAVANNAH RIVER WILL BE A LEADER IN PUBLIC PARTICIPATION THROUGH THE WESTINGHOUSE CORPORATION WHEN IT ASSUMES THE ROLE AS PRIMARY CONTRACTOR THIS SPRING AT SAVANNAH RIVER. I LOOK FORWARD TO WORKING WITH CONGRESS, WITH THE DEPARTMENT OF ENERGY AND WITH WESTINGHOUSE IN STRESSING THE IMPORTANCE OF ENVIRONMENTALLY SOUND AND PROGRESSIVE CLEANUP ACTIVITIES IN ORDER TO ASSURE THE AMERICAN PEOPLE THAT OUR NUCLEAR WEAPONS FACILITIES WILL BE RUN SAFELY AND PROPERLY FROM NOW AND INTO THE FUTURE. NOW IS NOT THE TIME FOR FINGER POINTING NOR IS IT THE TIME TO TRY TO PLACE BLAME ON WHO IS RESPONSIBLE FOR THE CONDITION WE FIND OURSELVES IN AT OUR GOVERNMENT-OWNED FACILITIES THROUGHOUT OUR COUNTRY; FOR IT IS ALL OF GOVERNMENT WHO SHARE EQUALLY THE RESPONSIBILITY FOR MAINTAINING OUR GOVERNMENT-OWNED NUCLEAR WEAPONS FACILITIES. WE MUST ALL NOW WORK TOGETHER TO ASSURE ADEQUATE FUNDING AND OVERSIGHT IN ORDER FOR THE PUBLIC TO BE CERTAIN OF THE CREDIBILITY OF THE OPERATIONS AND BE ASSURED THEIR SAFETY IS NOT JEOPARDIZED.

ATTACHMENT: Governor's Nuclear Advisory Council Report on Nuclear Safety, April 1988

IMPLICATIONS FOR SOUTH CAROLINA RESULTING FROM
THE NATIONAL ACADEMY OF SCIENCES REPORT
"SAFETY ISSUES AT THE DEFENSE PRODUCTION REACTORS"

A REPORT TO THE GOVERNOR,
THE SOUTH CAROLINA GENERAL ASSEMBLY,
AND THE JOINT LEGISLATIVE COMMITTEE ON ENERGY
BY
THE GOVERNOR'S NUCLEAR ADVISORY COUNCIL

April 25, 1988

Carroll A. Campbell, Jr.
Governor

State of South Carolina
Office of the Governor

CARROLL A. CAMPBELL, JR.
GOVERNOR

OFFICE OF EXECUTIVE
POLICY AND PROGRAMS

April 25, 1988

The Honorable Carroll A. Campbell, Jr.
Governor, State of South Carolina
Columbia, South Carolina 29211

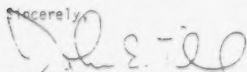
Dear Governor Campbell:

As requested in your letter of September 28, 1987, the Governor's Nuclear Advisory Council has completed its review of the National Academy of Sciences Report "Safety Issues At The Defense Production Reactors". Our report summarizing this review is attached.

The National Academy of Sciences study considered production reactors at both Savannah River and Hanford; however, the Council focused on the implications of the report to the State of South Carolina. We believe the National Academy of Sciences study was comprehensive and offered many recommendations that could significantly improve the long-term safety of operations at Savannah River. On the other hand, the Council recognizes the importance of Savannah River in nuclear technology, national defense, as well as its excellent safety record.

The Council appreciates the opportunity to carry out this review and hopes our report will be useful to the State, the Department of Energy, and the Savannah River contractor. If additional information is needed on this, please do not hesitate to contact me.

Sincerely,



John Till, Ph.D.
Chairman, Governor's Nuclear
Advisory Council

cc: Lt. Governor Nick Theodore
Speaker of the House, Robert J. Sheehen
Representative T. W. Edwards, Chairman,
Jt. Legislative Committee on Energy

Division of Energy, Agriculture and Natural Resources
Edgar A. Brown Building, Suite 333
1205 Pendleton Street
Columbia, South Carolina 29201
(803) 734-0445/734-1740

Governor's Nuclear Advisory Council

Office of the Governor
Division of Energy, Agriculture, and Natural Resources
Room 333
1205 Pendleton Street
Columbia, South Carolina 29201

John E. Till, Ph.D., Chairman

J. Charles Jennett, Ph.D., P. E.

Patricia O. Kusek

Robert I. Newman, P.E.

Joseph D. Spencer, Sc.D.

John N. McMillan, Sr.
Governor's Staff

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THE SOUTH CAROLINA
GOVERNOR'S NUCLEAR ADVISORY COUNCIL

The South Carolina Governor's Nuclear Advisory Council was established in June, 1980 by Legislative Act No. 517 Part II, §10A. The duties of the Council include providing advice and recommendations to the Governor on issues involving the use, handling, and management of radioactive materials in the State of South Carolina, including the various programs of the United States Department of Energy and other federal agencies operating in South Carolina. Recommendations of the Council shall be made available to the General Assembly and the Joint Legislative Committee on Energy.

PREFACE

The purpose of this report is to review the National Academy of Sciences Study, "Safety Issues at Defense Production Reactors", with particular emphasis on implications for the State of South Carolina. The Governor's Nuclear Advisory Council summarizes, in non-technical terms, key deficiencies related to defense production reactors noted in the National Academy report. In this review, the Council focuses specifically on reactors at the Savannah River Plant, although much of the National Academy study dealt with the N reactor at Hanford, Washington. The Council reiterates and supports many of the recommendations discussed by the National Academy. New recommendations included in our report are based on our consideration of implications to South Carolina.

This report was prepared by the members of the South Carolina Governor's Nuclear Advisory Council and represents a consensus.

EXECUTIVE SUMMARY

Following the nuclear accident at Chernobyl in April 1986, the Secretary of Energy requested the National Academy of Sciences and the National Academy of Engineering to assess the implications of the accident for a number of Department of Energy (DOE) reactors. The Academies formed a 16 member committee composed of scientists and engineers with extensive experience in light water reactor safety. The National Academy report, "Safety Issues at the Defense Production Reactors", was published in the fall of 1987.

The National Academy study included a wide range of findings related to facilities and management at defense production reactors. It was noted that although no serious accident has ever occurred at Department of Energy facilities, the safety objective is not clearly stated and more meaningful safety requirements should be implemented. The report identified 11 technical issues associated with potential, but highly improbable, accidents. As a result, it was recommended if designated production reactors are expected to continue to operate for more than a few years, technical improvements are needed to assure the safe operation of the facilities. It was noted the Department of Energy relied too heavily upon contractors for safety judgement and a weak system existed for the management of combined responsibilities of both production and safety. Additional external involvement by independent groups was recommended.

The South Carolina Governor's Nuclear Advisory Council reviewed the NAS study, focusing on deficiencies and recommendations that could directly affect citizens of the State. Our most noteworthy conclusions are summarized below.

- The National Academy report was comprehensive and carefully documented. Recommendations resulting from the study were broad in scope, substantive, and warrant serious consideration by DOE.
- Although defense production reactors embody some fundamental technical and operating differences from commercial power reactors, the Council believes DOE should commit to safety criteria that assure protection of the public comparable to that achieved by the Nuclear Regulatory Commission (NRC). These criteria should be implemented promptly and strictly adhered to without compromising safety.

- The Council believes it is essential that concerns of the states, where major DOE production facilities exist, be represented on the independent oversight group. Since the major operating DOE production facility is located in South Carolina, we recommend the oversight group contain at least one technically qualified individual representing the State of South Carolina.
- The Council recommends DOE continue to vigorously pursue, and South Carolina support, the construction of a new production reactor at the Savannah River Plant (SRP). Adequate funding must be continued to maintain the safe operation of the existing reactors until replaced by a new production reactor.
- The Council strongly concurs with the National Academy study recommendation that the DOE management structure currently existing at production reactors be reorganized to strengthen DOE's ability to regulate the SRP contractor. Appropriate funding must be granted by Congress to support this reorganization.
- The Council believes more rigorous interaction is needed between the State, DOE, and the contractor. More communication and cooperation is needed to ensure safety goals are being carried out in a spectrum of activities, including environmental monitoring and emergency planning. Adequate funding of State agencies chartered with this responsibility must be assured.
- The Council recommends renewed emphasis should be placed on public information activities at SRP.

IMPLICATIONS FOR SOUTH CAROLINA RESULTING FROM
THE NATIONAL ACADEMY OF SCIENCES REPORT
"SAFETY ISSUES AT THE DEFENSE PRODUCTION REACTORS"

1. INTRODUCTION AND OBJECTIVES

Following the nuclear accident at Chernobyl, the Secretary of Energy requested the National Academy of Sciences (NAS) and the National Academy of Engineering to assess the implications of the accident for the 11 Department of Energy (DOE) larger reactors. The Academies formed a 16 member committee composed of scientists and engineers with extensive experience in light water reactor safety. The Committee¹ completed its assessment of DOE production reactors (P, L and K at the Savannah River Plant and N at Hanford) and published their findings in a report² entitled "Safety Issues at the Defense Production Reactors", which was issued on October 29, 1987.

This report has been prepared by the South Carolina Governor's Nuclear Advisory Council. The objective is to review the findings of the National Academy's study that pertain to the Savannah River Plant (SRP) and, in particular, to discuss the implications of recommendations proposed in the NAS report as they relate to the citizens of South Carolina. Further, our own recommendations are included regarding action that should be taken by the State in order to follow changes at the Savannah River Plant resulting from the National Academy study. Our report is organized into three parts: a summary of the National Academy of Sciences report; a discussion of the implications to South Carolina of findings and recommendations reported by the National Academy of Sciences; and conclusions.

To obtain as much input as possible from all persons having an interest in the Savannah River Plant and the National Academy's

¹ Throughout our report, "Committee" refers to the National Academy Committee while "Council" refers to the Governor's Nuclear Advisory Council.

² Although the Council recognizes both the National Academy of Sciences and the National Academy of Engineering, under the auspices of the National Research Council, prepared the Academy's report, we refer to it as the National Academy of Sciences report (study) or the NAS report (study) for simplicity.

report, the Council actively sought comments from members of the public, technical and non-technical private organizations, and regulatory authorities of the State of South Carolina. Comments received from these groups were considered by the Council in their report. The Nuclear Advisory Council is grateful to those organizations and believes their comments contributed significantly to the substance of our report.

2.0 Summary of Findings in the NAS Report

Significant conclusions and recommendations related to SRP production reactors from the NAS report are summarized in Section 2. Implications for South Carolina are addressed in Section 3 with our recommendations in Section 4.

2.1 DOE Safety Framework

In Chapter 1 of the National Academy of Sciences report, the Committee examined the safety objective established by DOE for the production reactors and the process the Department and its contractors use to implement this objective. While noting no serious accident has ever occurred at either the Savannah River or Hanford sites, the Committee found DOE needs to more clearly state its safety objective and to implement more meaningful safety requirements to assure the safety objective is met. The Committee recognized additional funding would be required to achieve the desired level of assurance through expansion of the in-house technical capability of DOE and its contractors.

2.2 Technical Issues

Chapter 2 focuses on a variety of uncertainties concerning the production reactors, particularly those related to potential vulnerabilities to severe accidents. Severe accidents considered in the NAS study are those of very low probability of occurrence, but which result in extensive damage to the reactor structure and may result in a significant release of radioactive material to the environment. The Committee identified 11 technical issues associated with potential, but highly improbable, accidents. These issues are proposed as indicators of the state of readiness of DOE and its contractors to answer questions about the safety of the production reactors. The Committee noted aging-related concerns are becoming more evident at the production reactors. As a result of this aging, the Committee emphasized if the United States finds it necessary to ensure a reliable source of nuclear materials well into the future, then planning for a new production reactor should be accelerated. The Committee acknowledged that current reduced power levels at SRP should ensure prevention of core damage following a loss-of-coolant

accident. It also recognized the significant commitment of resources at SRP to develop a thorough understanding of the reactors' performance following a loss-of-coolant accident. The NAS Report recommended DOE assure itself of the adequacy of this technology before restoring full power operation.

On the general issue of severe accidents, the Committee concluded for those production reactors expected to continue to operate for more than a few years, a significant effort should be undertaken to develop more accurate severe accident source terms. Source terms are the quantities and types of radioactive substances released from a reactor during an accident. It noted that until the improved source terms are developed, it is difficult to make a realistic assessment of the consequences of severe accident conditions. It supported the objectives of the SRP severe accident program as being consistent with the stated needs. While expressing concern about the depth of understanding of severe accidents in the production reactors, the Committee stressed attention should not be diverted from programs with the more immediate benefit of preventing the occurrence of accidents.

The Committee also expressed concern about the possible release of radioactively contaminated water to the environment following a loss-of-coolant accident and recommended improvements be made in facilities designed to retain liquids that might otherwise be released to the environment.

2.3 Strengthening the Technical Basis for Reactor Safety Management

Chapter 3 discussed the relationship between DOE and its contractors, the organizational arrangements for ensuring the safety of reactors and the need for independent oversight. The Committee stated DOE has relied too heavily upon contractors for safety judgments and possesses a weak system for the management of the combined responsibilities of production and safety. Also, the Committee concluded the safety oversight of production reactors is ingrown and outside public scrutiny. To strengthen DOE's capability and effectiveness, the Committee recommended DOE acquire sufficient resources with adequate talent and deploy them in a well-structured management organization.

The Committee considered the need to establish an entirely new management structure responsible solely for the safety of the production reactors or to have the Nuclear Regulatory Commission (NRC) assume responsibility for safety. It was the Committee's judgment that enhanced oversight could best be achieved by forming a new independent safety advisory committee that would report to the Secretary of Energy.

3.0 Implications of the NAS Study to the State of South Carolina

This section of the Council's report examines key recommendations of the NAS study and their potential implications to the State of South Carolina. Our discussion follows closely the NAS report outline; however, we focus on areas where deficiencies noted by the Academy could result in implications to the citizens of South Carolina. Where possible, the Council recommends specific actions that should be taken to correct the deficiencies.

3.1 DOE Safety Framework

The Safety Objective

The NAS report noted, "The stated safety objective for the defense reactors is the achievement of a level of safety comparable to commercial nuclear power plants." This concept is referred to as comparability.³ While this concept is a commendable goal, it is difficult to firmly establish comparability for all aspects of reactor operations due to differences between commercial and production reactor design, operating parameters, and regulatory climate. Further, DOE does not explicitly define the comparability requirement in its guidelines⁴ to contractors.

In the early years of the design and operation of defense facilities, the Advisory Committee on Reactor Safeguards (ACRS) interacted strongly with DOE (then Atomic Energy Commission or AEC) and contractors at production reactors. Even though the ACRS had no enforcement power, this interaction led to a certain amount of comparability between production and commercial reactors in the area of safety. The formal mechanism has always existed for interaction between DOE and the ACRS; however, this pathway for advice and oversight has not been active for approximately 20 years.

Although defense production reactors embody some fundamental technical and operating differences from commercial power reactors, the Council believes DOE should commit to safety

³ The concept of comparability implies that production reactors should be operated and regulated in a manner that limits the risk to the general public comparable to that from commercial reactors.

⁴ The DOE equivalent for NRC regulations are documented in "DOE Orders."

criteria to be developed specifically for the production reactors. In any case, the Council recommends there be a clearer definition of the safety objective stated by DOE to its contractors and safety objectives be brought in line with safety standards in commercial reactors, taking into account the significance of the greater age of the production reactors. Further, the Council believes the State of South Carolina must be fully aware of the standards adopted for production reactors and updated when changes are considered.

DOE Orders

The DOE contractors operate on a different set of regulations and requirements from commercial facilities. The DOE equivalent of NRC regulations are documented in "DOE Orders" (Orders). The Orders set limits on operations as well as requirements for such functions as quality assurance, safety analyses and probabilistic risk assessment. Significant latitude is allowed with DOE concurrence in application of the Orders since they were developed to cover the wide spectrum of reactors within DOE, as well as non-reactor DOE facilities. It is not unusual for Department Orders to be followed "to the extent appropriate" and "if DOE finds that compliance would increase safety." Therefore, waivers to the requirements specified in the Orders are not uncommon. Facilities licensed by NRC do not have this degree of flexibility.

The Council urges immediate efforts be made to bring safety standards for production reactors in line with those of commercial reactors, with emphasis placed primarily on safety and only secondarily on budgetary considerations. Further, the Council concurs with the recommendation that DOE Orders be made more specific.

Verification of Compliance

The report stated DOE should conduct comprehensive, high quality audits of contractor performance on a frequent and continuing basis in order to assure compliance with the Orders. To date, this verification of compliance has not been adequately carried out because of limited manpower and inadequate expertise.

The Council strongly recommends the establishment of comprehensive evaluation protocols and audits to ensure technical safety issues are examined and resolved to the same degree as those for commercial reactors. The State of South Carolina should be informed of the results of audits and be updated on the progress of deficiency corrections.

Technological Vigilance

The NAS report stressed the need for increased technological vigilance by DOE over the contractors. In order to meet this need, the NAS report recommended DOE and its contractors establish outside review programs, improve their in-house technical capability, and employ consultants to provide additional expertise in critical areas. The NAS study recommended an "independent" oversight group be established which would report to the Secretary of Energy. The NAS Committee indicated it had considered various reporting arrangements for the oversight group, including having it report directly to the NRC to achieve greater independence, but decided, after considerable discussion, to recommend it report to the Secretary of Energy. The Council has concern whether this reporting arrangement will achieve the level of independence desired by the NAS and the level deemed essential by the Council. There was some sentiment expressed by the Council that the oversight group be fully independent of DOE. The effectiveness of the oversight group will be dependent on the leadership of its chairman, the quality of its members, the relationship with the Secretary of Energy, and the authority given in its charter.⁵ While the NAS Committee did not explicitly recommend the composition of the oversight group, the Council believes it is very important that concerns of the states, where major DOE production facilities exist, be represented. Since the major currently operating DOE production facility is located in South Carolina, we recommend the oversight group contain at least one technically qualified individual representing the State of South Carolina.

3.2 Technical Issues

Acute Aging Phenomena and the Need for Modernization

The report clearly substantiates the "acute aging phenomena" associated with the production reactors at SRP as evidenced by

⁵ During the time the Council has been reviewing the NAS report, the DOE has moved forward to comply with the NAS study recommendation and has formed an oversight group reporting to the Secretary. The Council will endeavor to meet with the new chairman and express our concern for the independence of this group and to hear from him as to how he hopes to assure its effectiveness.

the intergranular stress corrosion cracking⁶ of various plant components. As cited in the NAS report, this long term physical degradation could be the main life-limiting parameter for SRP reactors. There is currently an extensive ongoing program at SRP to investigate the effect of reactor aging. The Council believes the program must be given high priority and include a detailed peer review. Conclusions from this study must be incorporated in the safety analysis report and if safety is shown to be compromised, corrective action should be taken immediately. The Council believes safety considerations must be given top priority in allowing the continued operation of SRP production reactors. Congress must appropriate funds to bring these aging facilities up to current technological standards as expeditiously as possible and maintain their safe and continued operability until they are shut down. The Council recommends that appropriation requests for safety upgrades state the need for modification, so the implication of denying the funding is clear to the Congress.

Plans for replacing the production reactors are long overdue. The Council recommends DOE continue to vigorously pursue, and South Carolina support, the construction of a new production reactor at SRP. Adequate funding must be continued to maintain the safe operation of the existing reactors until replaced by a new production reactor.

Probabilistic Risk Assessment

The reactors at SRP have operated for 37 years with no major accident and an abundance of data have been collected related to their characteristics during that time. The NAS report stresses the need for additional accident analyses to be carried out using a technique known as "probabilistic risk assessment" (PRA). This method uses computer-generated simulations based on theoretical conditions to predict the impact of hypothetical accidents. Such a program has been underway at SRP for approximately two years and is due for completion in 1989. Over 45 person-years of effort will be expended, including extensive peer review by nationally recognized PRA experts. This new study utilizes SRP and nuclear industry data. The technical depth of the study is equivalent to that being carried out for licensed power reactors. If a new production reactor is located at SRP, information

⁶ Intergranular stress corrosion cracking can occur in stainless steel if material properties, the environment the stainless steel exists in, and the stress imposed on the material meet certain criteria. Crack growth will continue unless one or more of these three factors is altered, such as the chemistry of the reactor coolant water or the imposed stress.

learned from the ongoing PRA studies will be used as an integral part of the design process to optimize risk reduction.

The Council believes high priority should be given to this project to ensure its timely completion and the results should be incorporated in safety analysis evaluations for existing and proposed new reactors.

Confinement Systems

Production reactors use a "confinement" system which is significantly different from the "containment" system in place at commercial reactors. A confinement system is designed to allow the controlled, filtered release of radioactive substances during an accident while a containment system is designed to avoid the release of radioactive materials altogether.

The NAS report does not fully evaluate the use of a reactor containment system or a combination of both. The Council believes a containment system comparable to commercial reactor designs should be used for future production reactors. Although this recommendation may be outside the scope of this report, it seems appropriate in light of the large scale impact of the Chernobyl accident.

Human Performance

Almost by definition, assessment of human performance is more subjective than objective. Generally, the report gave the SRP operators a passing grade. The nuclear industry and the NRC have devoted considerable attention in recent years to studying ways to enhance the human-machine interface to reduce the probability of human errors. With an organization that has functioned for 30 years, complacency may become a problem. Computer systems are being designed and implemented in industry to minimize the risk of human error. The NAS study noted the importance of enhancing the human-machine interface by applying advanced computer technology to reactor operation, safety monitoring, and support analyses.

The Council recommends high priority be given to applying human factors technology to reactor operations to minimize the possibility of human errors which could result in increased risk to humans or the environment.

Liquid Effluents

The NAS report did not perceive the routine release of radioactive liquids from SRP operations as being harmful or inadequately monitored. However, the study concluded in the event of an accident at SRP, inadequate reservoirs exist to ensure large amounts of radioactive liquids would be contained and prevented from release to surface water streams. Therefore, the Committee concluded a means should be found to prevent the direct discharge of contaminated liquid to the environment following an accident. The Council concurs this improvement at the site would greatly reduce the chances of contamination of sediments, aquatic wildlife, and downstream water supplies. The impact of a significant release of radioactive materials to surface water is typically less important in terms of risk to the public than a release to the atmosphere. The Council believes DOE must recognize this difference between risk from accidental releases of radioactive substances to water versus air in allocating resources to implement the changes recommended in the NAS report.

Emergency Planning

The NAS report concluded on-site emergency planning and response capabilities at SRP appear to be comparable with those at commercial reactor sites. However, the report stated off-site planning and preparedness do not appear to be on a par with those of commercial reactors. The Council does not fully support this conclusion since various South Carolina agencies are directly involved with the planning and implementation of State and local emergency plans for nuclear facilities. However, we do agree SRP could improve their plans and procedures in order to be consistent with commercial facilities. The Council recommends DOE and State safety officials meet and take steps to resolve concerns expressed by the NAS Committee on off-site emergency response.

3.3 Strengthening the Technical Basis of Reactor Safety Management

The Role of DOE in Historical Context

The Atomic Energy Commission (AEC) was assigned the responsibility of production of defense nuclear materials in 1945. The AEC was reorganized into the Nuclear Regulatory Commission and a program-oriented agency in 1974; the latter became the Department of Energy in 1977. The AEC's role from the beginning was development and testing of nuclear technology. The DOE, however, has many non-nuclear responsibilities. Since the

mid-1970's, the federal government has held the view that private industry should primarily develop nuclear technology. The NRC has no responsibility for DOE-owned reactors.

The DOE's role in reactor safety has been diminished by funding constraints. Production reactors have not received the same degree of funding during recent years as they did during the early 1970's, resulting in the deferral of some reactor upgrades.

Although DOE formed an in-house panel to study its reactors in light of the Three Mile Island accident, the panel's report was narrowly focused on operator qualifications and training. The study pointed out DOE was not effectively carrying out its responsibilities for nuclear safety and it did not have the in-house capability to do so.

After Chernobyl, DOE moved to reevaluate its reactors. In the last year, DOE and the contractor have taken the following actions at SRP after concerns were expressed by several groups:

- reduced the power levels at SRP by 50-55% in response to concerns expressed by the NAS Committee reviewing production reactor safety;
- required the contractor to develop an action plan to assure the adequacy of emergency core cooling capability;
- announced plans to stop burying low-level radioactive waste in landfill trenches to prevent groundwater contamination; and
- announced plans to build a recirculating cooling tower to dissipate heat from cooling water from the K Reactor before it is discharged into streams.

These actions related to specific weaknesses, but the Council questions whether DOE can fully perform its safety duties with the management practices and resources it now uses.

The Current Management System

The production reactors are operated by contractors selected by DOE. The contractors maintain large staffs which perform many functions. They have experienced and technically sophisticated personnel who are familiar with the reactors. Each site also benefits from excellent support laboratories. The responsibility for safety at DOE production reactors rests primarily on the contractors, but DOE still is ultimately responsible for public safety and contractor performance. Authority flows from the

Secretary of Energy through the Under Secretary to local operation site office managers. The DOE managers at the sites are the DOE staff officials primarily responsible for giving direction to the contractors and for assuring the implementation of adequate environment, safety and health programs. The DOE staff offices have separate divisions responsible for reactor operations, safety, health and environmental requirements, quality assurance, and other functions. The production goal, the budget allocation for the production reactors, proposed plant modifications and changes in technical specifications and safety analyses must be approved by the Assistant Secretary for Defense Programs (DP). This responsibility gives the DP significant control over the operations office and the contractor.

Oversight of safety, quality assurance, and environmental performance of both DOE line management and the contractor falls under the Assistant Secretary of Environment, Safety and Health (ES&H). This organization conducts intensive appraisals of both production reactors and contractors' activities, a function which has been upgraded significantly during the past 18 months, including the placement of a DOE headquarters representative on site.

Principal Areas for Improvement

The ES&H, the DP, and the Under Secretary all depend on the DOE field office and the contractors for information about day-to-day plant operations and safety. The Committee's conclusions and recommendations as to DOE's management of the production reactors are divided into three principal areas:

(1) DOE's reliance on its contractors, (2) the current DOE management approach, and (3) the need for increased outside oversight.

The Committee concluded DOE relies too heavily on its contractors for the assurance of safety. While realizing DOE oversight must allow the contractor some degree of technical discretion, DOE must maintain comprehensive involvement to allow it to evaluate the contractor's performance.

The Committee's final recommendation is DOE should allocate the proper resources necessary to ensure the safe operation of its production reactors. Changes in staffing levels and budgets will be necessary to ensure comprehensive DOE involvement with the contractors. In addition, DOE should also strictly define and strengthen its reporting requirements with the contractors. The Council strongly concurs with these recommendations.

Regarding management structure, the ES&H organization has conducted several detailed appraisals of reactor operations in the last year, but several areas of weakness remain. The DOE plays a mixed role with the contractors in that it must be regulating as well as scheduling and financing. There is no formal system now in use to assess proposed reactor modifications explicitly taking into account public health risks. The Committee recommended measures to strengthen and improve DOE's existing management structure versus creating an entirely new management structure.

At DOE reactors there is little in the way of external oversight. As a result, DOE and the contractors do not regularly benefit from shared knowledge within the nuclear industry. Basically, any external oversight is loose-knit and insufficient. There is a critical need for independent review at DOE reactors. The addition of independent and aggressive oversight would help build the confidence of the public in the safety of these reactors.

As stated in Section 3.1, the Council concurs with the Committee's recommendation to establish an external safety oversight group to advise the Secretary of Energy. Above all, the Council concurs with the NAS recommendation that work of any oversight group, to the greatest degree possible, should be unclassified and available to the public.

4.0 Conclusions

The NAS study was undertaken at the request of the Secretary of Energy to assess the implications of the accident at Chernobyl for 11 DOE reactors. This fact in itself is noteworthy since it indicates DOE recognized the importance of examining, through an independent technical evaluation, facilities and management of its own production reactors. The Council commends the Secretary for this initiative.

The NAS report was comprehensive, carefully documented, and understandable. Recommendations resulting from the study were broad in scope, substantive, and warrant serious consideration by DOE. If recommendations in the NAS report are adopted, significant changes will be carried out in facilities, equipment and management at DOE production reactors.

The South Carolina Governor's Nuclear Advisory Council reviewed the NAS study, focusing on deficiencies that were noted and recommendations that could directly affect citizens of the State. Our most noteworthy conclusions are summarized as follows:

Although defense production reactors embody some fundamental technical and operating differences from commercial power reactors, the Council believes DOE should commit to safety criteria that assure protection of the public comparable to that achieved by NRC. These criteria should be implemented promptly and strictly adhered to without compromising safety.

The Council believes it is essential that concerns of the states, where major DOE production facilities exist, be represented on the independent oversight group. Since the major operating DOE production facility is located in South Carolina, we recommend the oversight group contain at least one technically qualified individual representing the State of South Carolina.

The Council recommends DOE continue to vigorously pursue, and South Carolina support, the construction of a new production reactor at SRP. Adequate funding must be continued to maintain the safe operation of the existing reactors until replaced by a new production reactor.

The Council strongly concurs with the NAS study recommendation the DOE management structure currently existing at production reactors be reorganized to strengthen DOE's ability to regulate the SRP contractor. Appropriate funding must be granted to support this reorganization.

The Council believes more rigorous interaction is needed between the State, the DOE, and the contractor. More communication and cooperation is needed to ensure safety goals are being carried out in a spectrum of activities, including environmental monitoring and emergency planning. Adequate funding of State agencies chartered with this responsibility must be assured.

The Council recommends renewed emphasis be placed on public information activities at SRP.

**UNITED STATES DEPARTMENT OF ENERGY
NUCLEAR WEAPONS COMPLEX
MODERNIZATION REPORT**

**Report to the Congress
by the
President**

DECEMBER 1988

EXECUTIVE SUMMARY

The major assumption in this Plan is that nuclear weapons will remain a principal element of the security of the United States for the foreseeable future. The Nuclear Weapons Complex (Complex) of the U.S. Department of Energy (DOE) provides the nuclear weapons that support the nuclear deterrent policy. This support includes production of nuclear material; design and manufacture of nuclear weapons; surveillance and maintenance of nuclear weapons in the stockpile; research, development, and testing of nuclear devices; and modernization of the nuclear weapons stockpile.

Much of the Complex was constructed more than 30 years ago. Some facilities are experiencing operability problems due to obsolete equipment and operational systems and to stresses in complying with more stringent environmental, safety, and health standards and requirements. Many facilities throughout the Complex are approaching the end of their useful lives. For example, the existing production reactors, at their current power limits, have limited operational capability. All three reactors are shut down for safety system improvements and are not expected to be fully operational until late 1989. In spite of these improvements and increasingly extensive maintenance, the reactors may not be able to achieve acceptable production efficiencies. Other elements of the Complex, as discussed in the report, are approaching a similar critical state to that of the production reactors. Correcting these inadequacies and placing these operations in an exemplary condition will require the support of both the Congress and the Administration to a major, long-term modernization effort.

The Congress recognized that a comprehensive (instead of piecemeal) approach was needed to address these problems and directed that a study be conducted and a plan prepared by the President "...for the modernization of the Nuclear Weapons Complex that takes into account the overall size, productive capacity, technology base, and investment strategy necessary to support long-term national security objectives." The study has been completed and a Modernization Plan (Plan) has been prepared.

The study shows that the entire Complex will require extensive modernization over the next 15-20 years to meet its obligations well into the next century. The principal requirements central to the need for modernizing the Complex are:

- o Meeting the Department of Defense (DoD) requirements for a modern nuclear weapons stockpile;
- o Maintaining nuclear weapons technological superiority;
- o Complying with environmental, safety, and health requirements; and
- o Providing the flexibility to adapt to changing production and technological needs with minimum impact on schedules and cost.

To meet these requirements, the Complex must retain all of its primary functions but must undergo several major modifications to its infrastructure. New production reactor capacity will be provided with the preferred sites being the Savannah River Plant and the Idaho National Engineering Laboratory. A Special Isotope Separation Plant is expected to be constructed at the Idaho National Engineering Laboratory to convert DOE inventories of fuel-grade plutonium into weapon-grade plutonium. Nuclear material operations will be consolidated to the extent that efficiency, environmental, or safety aspects of the operation can be improved and transportation of nuclear materials can be minimized. The most significant physical changes will be the relocation of all operations from the Rocky Flats Plant to other DOE facilities and the termination of Nuclear Materials Production activities at the Hanford Plant and at the Fernald Feed Materials Production Center. Nuclear materials activities at the Mound Plant will be transferred to existing DOE facilities that have nuclear materials operations. Waste Management and Environmental Restoration activities at these sites will continue until completion. Design and testing of new weapon concepts, certification of the safety and reliability of the nuclear weapons stockpile, and applied research will continue to be performed by the three nuclear weapons laboratories.

The modernized Complex will be more streamlined and cost effective with the flexibility to adapt to a broad spectrum of potential military, political, and technological futures. The resulting Complex will meet all applicable standards for protection of the environment and of the safety and health of employees and the public.

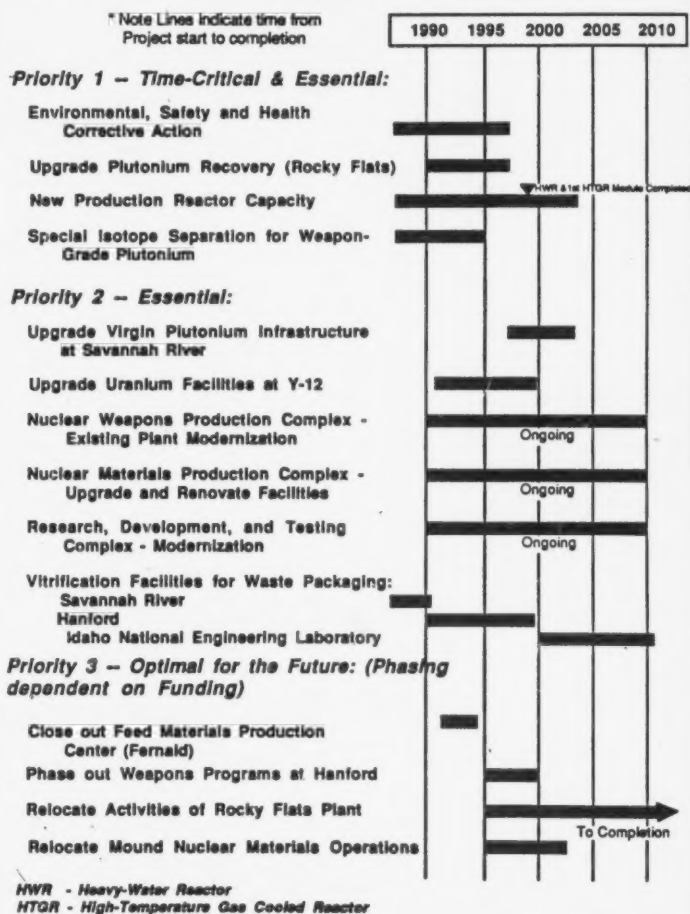
The key modernization actions are prioritized into three categories:

- o Those actions that are time-critical and essential for current operations;
- o Those actions essential for continued operations; and
- o Those actions needed to optimize the Complex for the future.

Figure 1 summarizes the prioritized modernization activities identified in the Plan and shows their tentative implementation schedules. In addition, key short-term activities, important in the transition period before modernization is completed, are addressed in the Plan (Section 6.3).

In developing a Resource Plan for modernization, all future demands for resources by the Complex were considered, whether or not they could be directly related to modernization of the Complex. Inclusion of all resources is not intended to provide a "twenty-year budget," but to recognize that competition for funding will require difficult tradeoffs and prioritization of all programs. An example is the Environmental Restoration program which includes environmental cleanup and decontamination and decommissioning of inactive facilities; although not a modernization activity per se, the costs of the Environmental Restoration activities are inescapable consequences of modernization.

Figure 1
Priority and Schedule of Key Modernization Actions



Specific annual funding profiles for accomplishing the modernization activities in this Plan are not included since such funding must be considered in the context of the total national security requirements in any given year. While the budget for Fiscal Year (FY) 1990 will be generally consistent with this Plan, accomplishing all recommendations of the Plan in the timeframe specified will require resources greater than those now expected to be available in future years. Thus, schedules shown in this document must be regarded as tentative.

The major modernization issues that must be resolved to implement this Plan effectively are:

- o The timing and level of sustained resources required independent of fluctuating annual production requirements;
- o Environmental, safety, and health issues; and
- o Issues associated with relocations, consolidations, and transportation.

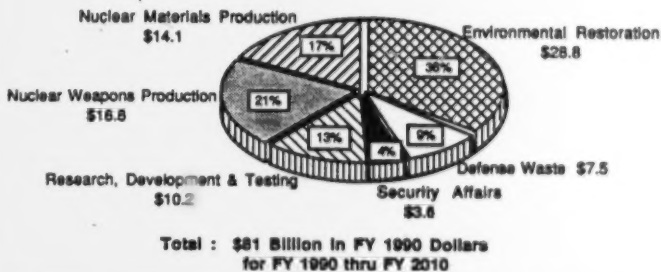
The estimated cost* for modernization and environmental restoration for the period FY 1990 through FY 2010 is about \$81 billion; about \$52 billion is associated with modernization. A breakdown by activity of the cumulative modernization and environmental restoration incremental costs for the 21-year period are shown in Figure 2.

Present and future operation of the Complex will require environmental, safety, and health corrective actions and a base program to ensure that these operations comply with applicable laws, standards, and regulations. These actions are separate from environmental restoration activities. Evolving regulations and standards and their application and differences in regional and state approaches will require realistic strategies that are consistently applied across the entire Complex. Funding constraints and our technical ability to achieve cost-effective compliance in facilities that are 30 or more years old dictate that a realistic schedule be established to replace or upgrade our facilities. As new facilities are built or existing facilities are upgraded for programmatic reasons, reviews will be conducted to ensure that state-of-the-art technology is provided to protect the environment and the safety and health of workers and the public. Approximately \$25 billion will be required over the next 20 years for the environmental, safety, and health base program and corrective actions.** This corresponds to a total increase of \$3.0 billion above the FY 1989 appropriation level accumulated over the 21-year period.

* The costs presented in the resource plan are not budget quality, but rather first-level approximations for use in identifying future trends and levels of effort. The cost of modernization in this report is expressed as the increment above the FY 1989 appropriated level summed over the 21-year period, FY 1990 through FY 2010. All dollar figures are expressed in constant FY 1990 dollars. The FY 1989 appropriated level expressed in FY 1990 dollars is \$7.8 billion. All estimates exclude funding for the Naval reactors program.

** This amount is included in the funding for the major programs listed in Section 2 and should not be added separately.

Figure 2
FY 1990 - FY 2010 Cumulative Increase
over Funding at FY 1989 Level



Apart from modernization, the cleanup and environmental restoration of the various sites present a technological and financial challenge that may dictate the degree and timing of this activity. The rate of increase and the level of funding can be adjusted to accommodate national priorities.

Major environmental restoration will be required at the Rocky Flats, Hanford, and Fernald sites when the Nuclear Weapons Complex activities are either relocated or terminated. As an interim program, certain upgrades will be required at the Rocky Flats Plant to maintain operations at an acceptable level of risk while the relocated facilities are being constructed.

This report highlights:

- o Nuclear arms control initiatives under consideration do not eliminate the need for nuclear deterrence.
- o The Nuclear Weapons Complex must be modernized so that nuclear deterrence can continue to be a principal element of the U.S. security policy.
- o The nuclear weapons stockpile does not exist in a static state but requires modernization to meet changing threats and to enhance the safety and operational characteristics of the weapons.

- o Modernizing the Complex will provide increased productivity and efficiency that will, over time, result in cost savings through consolidations and replacement of worn-out facilities that require significant maintenance and upgrading actions.
- o The cost of modernization and environmental restoration will require a significant increase in funding for the next two decades.
- o The approximately \$52 billion incremental expenditure above the FY 1989 level over the next 21 years to finance modernization will be well spent to maintain nuclear deterrence and to ensure acceptably low levels of risks to employees and the public.
- o The approximately \$29 billion above the FY 1989 level over the next 21 years required for Environmental Restoration is necessary as a result of past operations and planned relocations. This activity will continue beyond the period covered by the Modernization Plan until all required sites are restored.

Both the Administration and Congress recognize the need for the actions set forth in this report; expeditious implementation of the proposed Plan is recommended.

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LIST OF ABBREVIATIONS

BA	Budget Authority
Complex	Nuclear Weapons Complex
D&D	Decontaminate and Decommission
DoD	Department of Defense
DOE	Department of Energy
DW	Defense Waste
ER	Environmental Restoration
ES&H	Environment, Safety and Health
FMP	Feed Materials Production Center
FY	Fiscal Year
HEU	Highly Enriched Uranium
HLW	High-level Waste
HTGR	High-Temperature Gas-Cooled Reactor
HWR	Heavy-Water Reactor
INEL	Idaho National Engineering Laboratory
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
LLW	Low-level Waste
MHTGR	Modular High-Temperature Gas-Cooled Reactor
NMP	Nuclear Materials Production
NMPC	Nuclear Materials Production Complex
NPRs	New Production Reactors
NSC	National Security Council
NTS	Nevada Test Site
NWP	Nuclear Weapons Production
Plan	Modernization Plan
R&D	Research and Development
RD&T	Research, Development, and Testing
RFP	Rocky Flats Plant
SA	Security Affairs
SIS	Special Isotope Separation
SNL	Sandia National Laboratories
SRP	Savannah River Plant
S&S	Safeguards and Security
TRU	Transuranic Waste
V&CT	Verification and Control Technology
WG	Weapon-grade
WIPP	Waste Isolation Pilot Plant

1. BACKGROUND AND INTRODUCTION

The major assumption in this Modernization Plan (Plan) is that nuclear weapons will remain a principal element of the security of the United States for the foreseeable future. The Nuclear Weapons Complex (Complex) of the U.S. Department of Energy (DOE) provides the nuclear weapons that support the nuclear deterrent policy. This support includes production of nuclear material; design and manufacture of nuclear weapons; surveillance and maintenance of nuclear weapons in the stockpile; research, development, and testing of nuclear devices; and modernization of the nuclear weapons stockpile. Funding for the Complex represents approximately three percent of the Nation's defense budget.

The Complex comprises 15 major sites with multiple facilities dispersed throughout the United States. Many of the facilities that serve these functions were constructed more than 30 years ago. They were designed and built to standards and regulations very different and less stringent than those of today. Consequently, they are experiencing production problems due to obsolete technology and difficulty in complying with more stringent environmental, safety, and health standards and requirements. DOE has recognized these problems and has taken initial steps to upgrade some facilities and capabilities within its funding constraints. Over the years, these piecemeal improvements have been insufficient. *Therefore, significant commitments to modernize the Complex must be made now and must be continued into the future.*

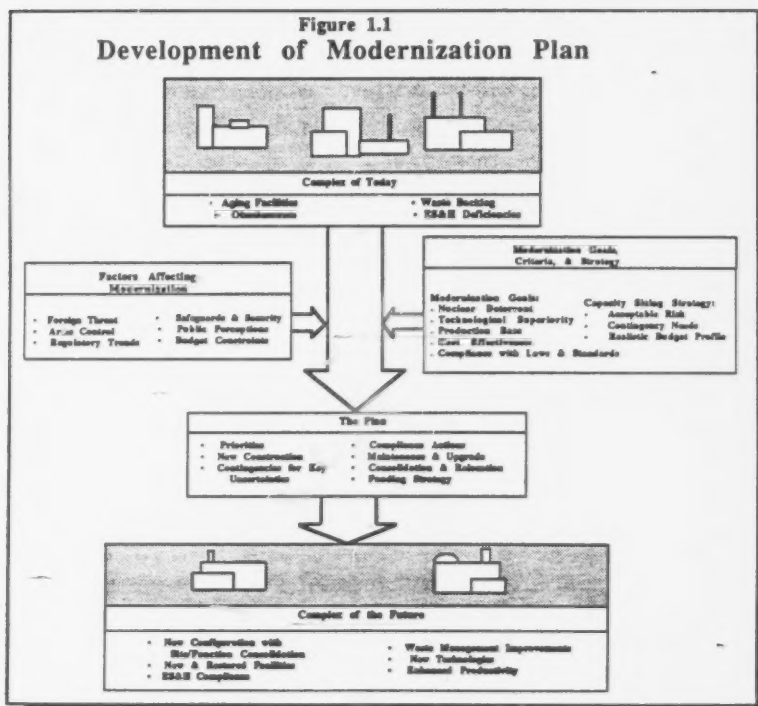
Modernization Charter: The Congress recognized these problems and directed, in Section 3132 of Public Law 100-180, that a study be conducted and a plan prepared to modernize the Nuclear Weapons Complex. Subsequently, the President directed the Secretary of Energy, in conjunction with the Secretary of Defense, to conduct the study and to prepare a plan *"...for the modernization of the Nuclear Weapons Complex that takes into account the overall size, productive capacity, technology base, and investment strategy necessary to support long-term national security objectives."*

Modernization Study and Plan: In response to these directives, the Secretary of Energy appointed a steering committee of high-level DOE, Department of Defense (DoD), and National Security Council (NSC) representatives (Appendix A) to direct and oversee a comprehensive planning study on the modernization of the Complex that would meet the objectives stated in the Congressional and NSC directives. Under leadership of the steering committee, a task force (composed of members from DOE and the private sector) was assembled to conduct the study, develop the desired Modernization Plan, and prepare a report documenting the results.

The Nuclear Weapons Complex Modernization Plan (Section 6) defines the characteristics and configuration of the future Complex necessary to fulfill the national security requirements and to set forth the actions and resources required to achieve a fully modernized Complex.

Approach: The approach used to develop the Modernization Plan for the Complex is illustrated in Figure 1.1. First, the state or condition of the existing Complex was determined with respect to requirements placed on it in the areas of national security, environment, safety, health, and safeguards and security. From an analysis of this information, modernization criteria and goals were developed. The Nuclear Weapons Council furnished sizing criteria that provide the flexibility to adapt to future requirements of the DoD. Based on these criteria and goals, the desired configuration of the modernized Complex was defined in terms of new or replacement capabilities, restored and improved facilities and processes, consolidated and retired facilities and activities, and research, development, and testing capabilities. Finally, a plan was developed to define the actions and resources needed to convert the Complex of today into the desired modernized Complex of the future in a way that ensures support of the nuclear deterrent in a safe and environmentally sound manner.

Figure 1.1
Development of Modernization Plan



2. NUCLEAR WEAPONS COMPLEX MISSION

The mission of the Complex is to provide the DoD with safe, secure, reliable, and operationally effective nuclear weapons and components utilizing state-of-the-art nuclear technology to ensure that the Nation's nuclear deterrent remains effective and viable into the foreseeable future. To accomplish this mission DOE must: (1) maintain the nuclear weapons stockpile, certify the reliability and safety of nuclear weapons, and modernize the stockpile based on requirements provided by DoD; and (2) continue to perform the research, development, and testing necessary to maintain technical superiority over the Nation's adversaries and to prevent technological surprises.

Nuclear weapons are very complex devices that must meet precise and extreme quality and safety performance standards. These devices are expected to operate, when required, at any time during the stockpile life of 20 or more years and, more importantly, to not operate unless all requisite conditions are met.

The Complex is organized into four major mission-oriented, programmatic elements described below.

Research, Development, and Testing (RD&T): The RD&T program pursues technological advances that will provide the U.S. with options for political and military leverage. This includes identifying new areas of technical opportunity, initiating research to open new opportunities, and neutralizing or minimizing technological or other advantages of our adversaries. The RD&T complex: certifies the reliability and safety of the current stockpile; designs and tests nuclear weapons; conducts exploratory research to avoid technological surprise and to provide future weapon design options; and supports national arms control objectives.

The Verification and Control Technology (V&CT) program,* which is carried out by the RD&T complex, coordinates the formulation and development of DOE positions relating to arms control initiatives and fulfills DOE responsibilities in energy, nuclear weapons, and treaty-related intelligence.

Nuclear Materials Production (NMP): The NMP element of the Complex supplies nuclear materials (i.e., tritium, weapon-grade [WG] plutonium, and highly enriched uranium [HEU]) for nuclear weapons to support the Nation's nuclear weapons stockpile. (NMP also purchases very highly enriched uranium for naval propulsion reactors.) In addition to the requirements for new weapons, tritium is also produced to replace tritium

* V&CT activities are budgeted as part of Security Affairs.

that has undergone radioactive decay in the stockpile so that the effectiveness of the weapons in the stockpile is maintained. Nuclear materials for stockpiled weapons are supplied by a combination of: (1) recycle and recovery of material that has been in the stockpile; and (2) production of new materials in nuclear reactors and uranium enrichment facilities.

Nuclear Weapons Production (NWP): The NWP element: (1) manages a program to maintain and evaluate the Nation's nuclear weapons stockpile for continued reliability and existence in a modern state of operational readiness; (2) manufactures, modifies, and retires nuclear weapons that must meet rigid quality and safety standards; and (3) transports nuclear weapons and major components among DOE and DoD locations.

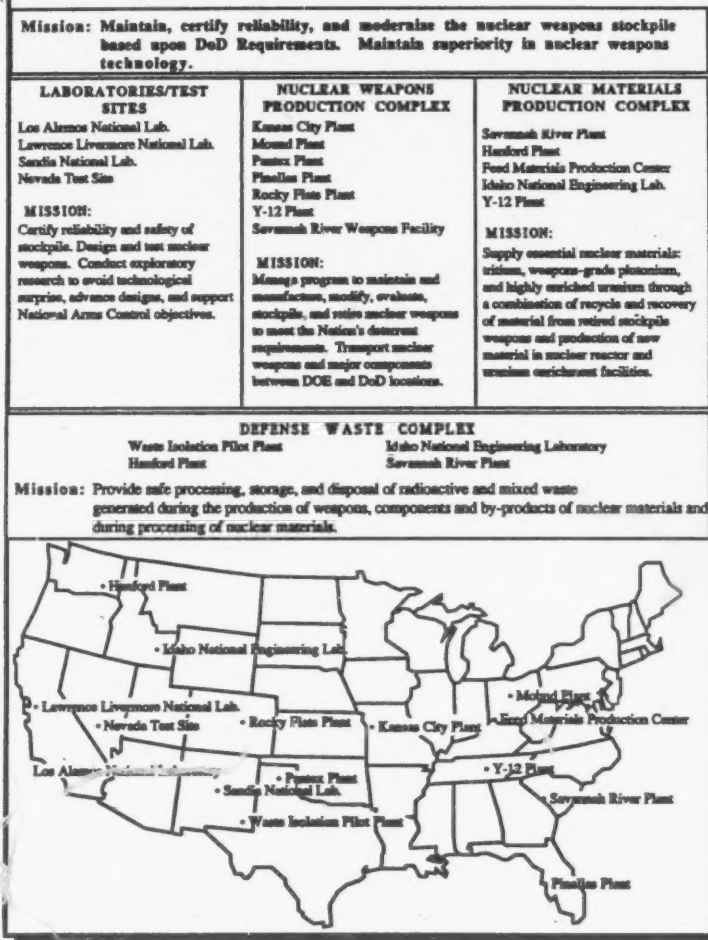
Defense Waste Management: The Defense Waste Management Program includes waste management and environmental restoration. The Waste Program provides treatment, storage, and disposal of radioactive and mixed waste generated during the production of weapons, components, and nuclear materials, and during processing of nuclear materials. The Environmental Restoration Program manages activities to cleanup environmental contamination and activities to decontaminate and decommission (D&D) inactive facilities at the Complex sites.

Figure 2.1 relates these program elements to the 15 major sites in the Complex.

In addition to these four major programs, there are supporting programs that affect all of the sites, facilities, and operations: (1) Safeguards and Security (S&S); and (2) Environment, Safety, and Health (ES&H) in support of the ongoing mission.

Appendix B briefly describes the missions at the 15 major sites in the Complex.

Figure 2.1
Nuclear Weapons Complex



3. FACTORS AFFECTING MODERNIZATION

The need to modernize the Complex is driven by factors that are external and internal to DOE: (1) the potential for further nuclear arms control; (2) the current status of the Complex with its aging infrastructure and increasing obsolescence; (3) the requirements to meet more stringent regulations and higher standards for environmental protection, safety, and health than existed when most facilities in the Complex were designed and built; (4) the need to complete S&S upgrades; (5) public concern of risks associated with nuclear operations; and (6) the pressure to minimize costs in recognition of the federal deficit. As will be developed from the discussion in the following paragraphs, *there is a compelling and urgent need to undertake an extensive modernization program for the Complex to ensure that the Complex will be able to satisfy its national defense mission while meeting regulatory and institutional requirements.*

3.1 Nuclear Arms Control and Reductions: Significant arms control initiatives are being pursued by the Soviets and the U.S. that provide expectations, on the part of some, of a reduction in nuclear weapons and a concomitant reduction in the threat to the U.S. It is difficult to predict the outcomes of arms control initiatives; however, under most nuclear arms control scenarios, the capabilities of the Complex, both technical and productive, must be maintained.

Increased testing restrictions may effect the nuclear deterrent and the future configuration of the nuclear weapons complex. Technological superiority will continue to be important and, thus, the RD&T program must be continued at an effective level of effort. In addition, a base production capability would have to be maintained to modernize the possibly smaller stockpile, replenish its tritium, and provide a capability for responding to a possible breakout from any arms control agreement.

3.2 Current Status of the Complex: Maintaining the nuclear deterrence capability of the United States requires the continued viability of the Complex. Determining the actions and resources required for maintaining this viability begins with an assessment of its current status, particularly with the status of those facilities involved with the production, processing, and handling of nuclear materials.

A majority of the facilities at the 15 major sites in the Complex were designed and built between the late 1940s and mid-1960s. These facilities reflect the strong emphasis placed on nuclear defense during the post-World War II period. During this early period when the U.S. built up its stockpile of nuclear weapons, significant redundancy was built into the Complex, especially for nuclear materials and weapons production activities. Gradually, this redundancy has been reduced as a consequence of funding considerations and the aging of the Complex.

The Complex has endured an historically low rate of expenditure for maintenance and restoration of its infrastructure. For example, maintenance expenditures at the Savannah River Plant (SRP) have averaged less than two percent of facility replacement values.

(Industrial experience suggests that these expenditure levels should average between four and seven percent of replacement value.) This historically low investment in the infrastructure of the Complex was the consequence of meeting production demands coupled with funding constraints leading to deferral of maintenance.

Although many of the facilities are being upgraded, their basic design and construction reflect standards of the late 1940s and 1960s. These predated the present, more stringent environmental, safety, and health regulations and standards, as well as S&S requirements driven by worldwide terrorist events. These evolving regulations and standards, combined with gradual population encroachment upon DOE sites handling nuclear material, have exacerbated the cumulative effects of aging and obsolescence that are hindering operations in many facilities.

Many facilities have reached or are rapidly approaching the end of their useful lives. Upgrades and renovations have, in many cases, extended their period of operation. This piecemeal approach has worked in some cases (such as the Kansas City and Pinellas weapon component plants) where modular designs and the nonnuclear nature of the operations are well suited to modernization by replacement of production lines. However, in many other facilities, especially those with nuclear materials production operations, renovations and upgrades have only provided temporary relief of problems associated with aging and obsolescence. Additionally, increased safety oversight has identified major technical questions about the antiquated production facilities resulting in reduced limits for allowable operation and extended outages for facility upgrading and backfitting.

To quantify the state of existing facilities, DOE has developed a basis for comparison, designated "fragility," in which production facilities of the Complex were rated against industry norms for similar types of facilities. This figure of merit accounts for the effects of age, obsolete technology, failure to meet today's ES&H and S&S standards, and potential vulnerability to existing institutional and societal concerns. Results of the comparison show that some key facilities have an unacceptable fragility rating. The majority of these facilities are involved in the production or processing of nuclear materials.

It is difficult to compare the RD&T facilities to an industry norm because of the unique characteristics of many of these facilities. The RD&T complex was treated as a whole rather than individual sites. The estimate for the entire RD&T complex is a fragility rating slightly less than satisfactory.

Overall, the Nuclear Weapons Complex, which up to now has relied on piecemeal upgrades to its facilities, is neither modernized for its primary mission nor sufficiently upgraded to meet today's ES&H and S&S requirements.

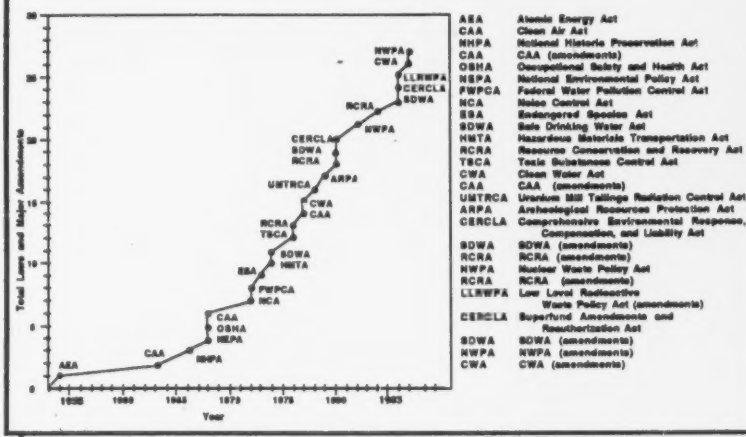
3.3 Environmental, Safety, and Health Requirements: Complying with applicable federal and state laws and requirements, such as those associated with protection of the environment, safety, and health of employees and the public, has become more difficult. This difficulty has resulted from the increase in numbers of such laws and their prescriptive requirements. Figure 3.1 shows most of the environmental laws and major amendments affecting DOE. Contemporary nuclear safety requirements developed for commercial power plants are being adopted for DOE use. These more stringent requirements are a consequence of changes in understanding of risk inherent in operating industrial and nuclear facilities and of a change in public attitudes regarding acceptable levels of risk. These attitudes have been, and will continue to be, affected by external events such as Bhopal's chemical disaster, the serious Chernobyl nuclear reactor accident, and the Three-Mile Island reactor incident.

The changing requirements and their strict interpretation make it difficult to achieve successful compliance in facilities that are 30 years or more old. The criteria to which most facilities in the Complex were designed and constructed often do not meet current standards in areas such as seismic design, fire protection, and environmental pollutants (air and water emissions). Furthermore, past practices that once were acceptable for waste treatment and disposal do not comply with today's regulations. Consequently, major cleanup of waste sites is required for active and inactive facilities. Failure to meet ES&H requirements could result in the shutdown of key sites or facilities in the Complex for significant periods of time.

Another regulatory trend that inhibits operations of existing facilities in the Complex is the move toward delegating regulatory authority from the Environmental Protection Agency to state regulatory agencies. States often promulgate different requirements and standards resulting in different compliance strategies among DOE facilities. State agencies are generally not sensitive to DOE's budget constraints, national nuclear deterrence requirements, and DOE's need to balance ES&H priorities among many sites. Yet, clearly DOE must establish priorities in its implementation of programs to comply with ES&H regulations because there are too many problems and insufficient funding to address all problems concurrently.

3.4 Safeguards and Security: Most DOE facilities were constructed with S&S systems that did not protect against the currently understood threats and did not incorporate modern S&S systems and technology. DOE undertook an expensive and difficult program to incorporate effective protection systems. In some cases, vulnerabilities were addressed by temporary S&S systems; in other cases, DOE incorporated permanent, effective, and efficient upgrades. The long-term focus will be on development of technology and systems to meet future requirements with emphasis on potential insider-threat protection measures.

Figure 3.1
Major Environmental, Safety & Health Legislation Affecting DOE



3.5 Public Concerns: The problems DOE is experiencing (in operating aging facilities, cleaning up waste, and complying with regulations) are receiving extensive press coverage and public scrutiny. Active environmental, antinuclear, and disarmament groups are using available information on operations of the Complex to convince the public that such operations are too risky and, in most cases, unnecessary. Consequently, there exists a concern by many in our society that operation of some of DOE's nuclear weapons facilities involves unacceptable levels of risk.

The Rocky Flats Plant (RFP) near Denver will likely continue to face a problem of public opposition due to the increasing population in areas surrounding the site. In spite of any DOE steps to modernize this facility in the future. The operation of the Complex's nuclear materials

facilities has become particularly vulnerable due to the adverse publicity and the public perception that the nuclear materials facilities have been operated in an unsafe manner.

Problems of aging facilities, waste cleanup, and complying with ES&H requirements have damaged the public image of DOE's nuclear weapons program. An integrated, well planned modernization program comprising the addition of new capabilities (e.g., waste disposal), replacement of some key facilities, renovation and retrofitting of other needed facilities, together with a prioritized program of environmental cleanup should help regain credibility and the general confidence of the public.

3.6 Funding Constraints: Constraints on defense spending due to the large federal deficit are expected to continue over the next several years when expenditures to modernize the Complex will be at their greatest. During this period, costs of ES&H corrective actions will grow as DOE continues to implement programs at the sites to comply with applicable requirements and standards. Lack of funding for these programs will jeopardize the reliability and viability of the nuclear deterrent.

Continued operation of the Complex without its extensive modernization will result in the following:

- o Steadily increasing maintenance outages, decreased productivity, and a greater risk of not meeting production goals;
- o Increasing risk of incidents that could impact the public and the environment and result in shutdown of a key facility;
- o Continued operation with piecemeal solutions to ES&H and waste disposal problems;
- o Decrease in technical competence and technological superiority; and
- o Continued competition for limited funding without setting priorities on a sound cost-benefit basis, leading to fragmented support of programs within the Administration and Congress and, subsequently, to the inefficient use of resources.

4. MODERNIZATION GOALS, CRITERIA, AND STRATEGY

4.1 General Goals: The overall goal of the proposed Nuclear Weapons Complex modernization program is to transform the existing Complex into one that will achieve the following:

- o Support the Nation's nuclear deterrent with an acceptably low level of risk.
- o Maintain a reliable, safe, secure, and efficient base for stockpile maintenance and production of nuclear weapons and nuclear materials, including an adequate contingency capability.
- o Maintain a superior, flexible, and responsive RD&T capability.
- o Attain compliance with environmental laws and regulations.
- o Ensure the health and safety of workers and the public.
- o Ensure the security and safeguarding of all weapon components, nuclear materials, and laboratory and manufacturing facilities.
- o Effectively use funds and resources in achieving the mission objectives.
- o Improve the public acceptance of the Nuclear Weapons Complex, as a consequence of recognized reliable, safe, secure, and environmentally sound operation.

4.2 Nuclear Weapons Complex Capacity and Capability Criteria: The proposed Modernization Plan, described subsequently in Section 6, defines actions that will reconfigure the infrastructure of the Complex, establish its productive and technological capabilities, and establish DoD nuclear weapons potential for many years beyond the turn of the century. As a basis for this plan, the Nuclear Weapons Council provided sizing criteria for defining the desired capacity and capability envelope for the Complex's programs for the next 20 years. These criteria served as the basis for sizing weapons production operations; for determining the base level of effort of the weapons laboratories to support the stockpile; and for sizing the tritium, WG plutonium, and HEU supply missions in the long term. It represents DoD/DOE's best judgement of potential future stockpile needs and DOE's best judgement of the resources required to meet DoD needs (accounting for future uncertainties in the level of threat and providing reasonable assurance that the deterrence level is adequate).

4.3 Modernization Strategy: The underlying premise of the modernization strategy is that, within the envelope provided by the criteria, the Complex must maintain flexibility and adaptability to respond to changing requirements. A four-part strategy was developed for the modernization of the Complex:

- o Provide flexibility to adapt to changing production and technological needs with minimum impact on schedules and cost.

- o Take corrective actions necessary to ensure full compliance with applicable ES&H laws and standards pertaining to ongoing operations.
- o Consolidate activities or relocate facilities, as needed, to enhance safety, minimize transportation risk, and reduce long-term cost.
- o Minimize technical and project risk in implementing modernization programs.

5. FINDINGS AND RECOMMENDATIONS

Following are specific findings and recommendations for modernizing the Complex. Implementation of these recommendations will achieve a modernized Nuclear Weapons Complex capable of operating in a safe and environmentally acceptable manner into the 21st century. In addition to these recommendations, key short-term activities that are essential during the transition period before modernization is completed are identified in Section 6.3.

5.1 Research, Development, and Testing (RD&T): The DOE's Nuclear Weapon Technology Program is concentrated in three nuclear weapons research and development (R&D) laboratories. Unlike the DoD's RD&T complex, where a multitude of industrial contractors participate and compete for new systems, nuclear weapon designs are restricted to government-owned facilities. Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL) are involved with applied research and the design, development, and testing of the physics packages for nuclear weapons. Sandia National Laboratories' (SNL) major mission is nuclear weapons systems ordnance engineering, nonnuclear component design and development, field and laboratory testing, and manufacturing engineering. Underground nuclear testing is done at only one location, the Nevada Test Site. Nonnuclear testing is done at the Tonopah Test Range.

The RD&T program is the only source of new technology application for the development of weapons required to meet evolving DoD needs as they respond to evolving threats. The DOE laboratories design, build prototypes, test, and continue oversight of the weapons throughout manufacture and stockpile life until the weapons are retired. Because future requirements are inherently uncertain, the RD&T program must have the flexibility to respond to a changing international environment and changing national requirements.

Findings:

- o A vigorous RD&T program, staffed with outstanding scientists and engineers, is fundamental to maintaining the nuclear deterrent and must be strengthened to prepare for and respond to a wide spectrum of uncertain military, technical, and political futures.

- o Consolidation of the national weapons laboratories would not be cost effective. Instead, it would be counterproductive by limiting the technology base and by eliminating the benefits of peer review and competition of ideas and designs.

Recommendations:

- o Continue to provide the technology base at the three weapons R&D laboratories to maintain and modernize the stockpile and to pursue a vigorous applied research program to develop future weapon technology options.
- o Augment and restructure the nuclear test program such that it can adequately respond to the challenges facing the RD&T program in the future (particularly to maintain a modern nuclear weapons stockpile, to explore advanced concepts for nuclear weapons, and to structure a physics program for investigations) that assess the impact of nuclear testing restrictions in accordance with Section 1436 of the National Defense Authorization Act for FY 1989.

Finding:

Technical obsolescence, changing ES&H requirements, and S&S standards require ongoing replacement and modernization of facilities and equipment.

Recommendation:

Establish a level of about four percent of the RD&T equipment and facilities replacement value per year as the appropriate annual capital investment rate. This amounts to \$10.5 billion over the 21-year planning period, which represents an increase of \$3.1 billion above the Fiscal Year (FY) 1989 appropriation level accumulated over this period.

Finding:

Approximately 30 years ago when work on weapons design began at the Livermore site, it was located in a relatively isolated area. However, during the intervening years, the population of nearby areas has increased significantly. Although nuclear materials have regularly been handled and processed at the Livermore site in a safe and secure manner, and at technically acceptable levels of risk, the possibility of increased public concern in the future cannot be ignored. Current mission assignments can be accomplished at existing facilities.

Recommendation:

Future plans for the Livermore site should include construction of new facilities at a more remote DOE site to accommodate any significant increase in nuclear material handling and processing at the Livermore site.

5.2 Nuclear Materials Production: The cornerstone of the Nuclear Materials Production Complex (NMPC) consists of the large production reactors and supporting infrastructure (fuel/target fabrication facilities and spent fuel and product processing facilities), located at the Savannah River Plant (SRP) and Hanford, that supply tritium and WG plutonium for warheads. These facilities have large fixed costs; produce hazardous and radioactive products, by-products, and waste; and currently suffer, to various degrees, from the effects of age, obsolescence, and a variety of regulatory compliance problems.

Assurance of an uninterrupted tritium supply, including provision for a tritium contingency, must be given highest priority in planning for modernization of the NMP facilities. Supply of needed WG plutonium in the near term from processing of existing plutonium residues and irradiated target inventories has second priority, followed by the provision for supplying plutonium in the intermediate to long term.

Finding:

The near-term supply of tritium is at risk because of the safety-related issues with existing SRP reactors.

Recommendation:

Complete essential safety and other improvements to the SRP reactors to allow their restart, increase their power, decrease unscheduled maintenance outage time, and ensure continued production over the next decade.

Finding:

Modernization will require renovation and retrofitting of existing facilities, introduction of new and improved process technologies, construction of a few new or replacement facilities, consolidation of activities into fewer facilities, and phasing out operations in unneeded or non-cost-effective facilities. Replacement with new production reactor capability is urgent and essential to ensure an uninterrupted supply of tritium for long-term support of the stockpile.

Recommendations:

- o Construct two new production reactors (NPRs) at two sites to satisfy the goals of redundancy, diversity, and site duality for tritium production. The estimated cost of acquiring and operating the two NPRs is \$7.9 billion, including about \$6.6 billion in capital.

One NPR should be a modernized version of the current low-temperature, Heavy-Water Reactor (HWR), because it has the highest level of technical and production assurance (lowest uncertainties). The preferred site for this reactor is SRP where the infrastructure exists to support tritium production as well as the production of WG plutonium and other isotopes.

Most of the fuel/target-cycle and other facilities supporting the production reactors at SRP can be renovated and retrofitted to meet a future reactor production mission at that site. Consolidation of the two separation areas into one area should be undertaken to reduce operating costs. A few facilities, such as fuel fabrication and tritium extraction and purification, will require replacement in the 1990s to meet long-term mission requirements.

The other NPR should be a Modular High-Temperature Gas-Cooled Reactor (MHTGR). The preferred site is the Idaho National Engineering Laboratory. It is to be sized to provide capacity for preproduction of tritium for contingency purposes and for sufficient makeup tritium for maintaining the stockpile in case of a protracted loss of the HWR. It will be of an advanced design with features, such as inherent safety, that would be desirable in the next generation of power reactors. In this way, the MHTGR would serve several national goals: tritium contingency in the case of an outage of the HWR; tritium production to allow Savannah River to support limited production of other essential nuclear materials such as WG plutonium; capability for potential production of WG plutonium; and demonstration of an advanced reactor concept. Fuel and target fabrication, head-end fuel reprocessing, and tritium extraction facilities are to be built to support the MHTGR.

- o Upgrade and renovate essential facilities to meet modernization objectives, including productivity improvements and operating cost savings. A continuing investment of about four percent per year of the facilities' replacement value will be needed. This amounts to about \$14 billion over the 21-year period, which represents an increase of about \$4 billion above the FY 1989 appropriation level accumulated over this period.

Finding:

The future supply and demand relationship for plutonium is much more uncertain and has much larger potential variations than for tritium. Meeting future requirements and providing adequate contingency capability will require a multiplicity of supply sources during the planning period. During the next five to six years, additional plutonium must be supplied by its recovery from the residue backlog and from inventories of irradiated targets and fuel (see also Sections 5.3 and 6.3). In the long term, additional production capability will be needed to ensure that potential plutonium requirements can be met.

Recommendations:

- o Construct a Special Isotope Separation (SIS) plant at INEL, the preferred site, to convert DOE inventories of fuel-grade plutonium into WG plutonium. Operation of the SIS plant will ensure that plutonium requirements for the 10-year period beyond FY 1995 can be met and will provide a long-term contingency capability.

- o Modernize the plutonium infrastructure at SRP to provide capability beyond FY 2000 to process limited quantities of virgin plutonium from the new HWR, if needed.

Finding:

The Hanford site will not have a Nuclear Materials Production mission much beyond the time that N Reactor is removed from cold standby unless additional production facilities are located there.

Recommendation:

Complete the processing of onsite N Reactor fuel and plutonium through PUREX Plant and the Plutonium Finishing Plant within four to five years followed by the phase out of all Hanford NMP facilities to effect cost savings. Continue waste management operations throughout the planning period.

Finding:

The Feed Materials Production Center (FMPC) at Fernald is severely deteriorated and the projected workload is decreasing. It would be cost effective to transfer its remaining functions.

Recommendation:

Close out the FMPC facilities in the near term (early 1990s) to avoid costs of expensive renovations. Consideration should be given to preproduction of depleted uranium materials for military and NMP programs. Any remaining tasks should either be relocated to another DOE site or contracted with a commercial vendor.

Finding:

The uranium enrichment enterprise continues to reliably meet defense materials needs, as it has since the mid-1940's. This need will continue for as long as we have a nuclear-powered Navy and will be required to meet weapons demand in the 1990s. Planned capacity upgrades are adequate to meet weapons demand now projected for the 1990s. The production level of existing enrichment facilities is determined primarily by commercial rather than defense requirements. Uncertainties regarding the economic operation of these facilities into the longer term are significant.

Recommendation:

Continue to meet the Navy's requirements for Very Highly Enriched Uranium and provide additional funding estimated at approximately \$3 billion for production of oralloy.

5.3 Nuclear Weapons Production: The Nuclear Weapons Production (NWP) element of the Complex is an interdependent, single-track production system with limited redundancies in which seven plants all contribute to the production of a nuclear weapon. In contrast to classical factories where large quantities of a product are manufactured, the NWP Complex produces relatively small numbers of final, sophisticated products with a lifetime guarantee. This results in a very large infrastructure with relatively high fixed costs. Approximately 75 percent of the costs are required to maintain the capacity and capability for this element of the Complex.

Increased operating efficiencies in the NWP Complex should continue to be pursued to reduce operating costs. An aggressive productivity-improvement program is being pursued in many areas, including scrap reduction, computer-integrated manufacturing, increased utilization of industry to fabricate weapon components, contractor performance incentives, and computerized production scheduling to reduce material inventories. These and other productivity initiatives are anticipated to result in a savings of about 3,000 plant personnel over the period FY 1987 - 2010.

A significant element of the NWP Complex mission is the responsibility to transport nuclear weapons, nuclear weapons components, and waste products. The transportation requirements, costs, and potential risks to the public should be considered as a major criterion in the relocation of any SNM processing facility.

Finding:

Significant modifications of the NWP Complex infrastructure must be made over the next two decades to ensure continued viability and cost effectiveness. The primary problems of the NWP Complex are the result of aging facilities and the need for ES&H upgrades.

Recommendation:

Provide a continuing annual investment of about four percent of the facilities' replacement value for essential equipment and facilities to modernize the NWP Complex so that capability is maintained and increased efficiencies are achieved. This amounts to \$13.5 billion in capital funds over the 21-year period (FY 1990 - FY 2010) for maintaining the production viability to meet projected DoD requirements. This represents an increase of about \$6 billion above the FY 1989 appropriation level accumulated over the 21-year period.

Finding:

The RFP and the Mound Plant were located in relatively isolated areas when first constructed. In the intervening years, the population of areas adjacent to both sites has increased significantly. A continued increase in the nearby population density is expected for both sites. These plants are being operated in a safe and environmentally acceptable manner at technically acceptable levels of risk to the public. Appropriate modernization should allow them to continue to do so.

However, the public perception of risk is such that even insignificant incidents involving nuclear materials may result in major impacts on production.

Recommendations:

- o Initiate the relocation of RFP activities in the next decade. The plant processes large amounts of plutonium which is the focus of local concern. Although new facilities that meet today's stringent criteria can be provided to continue processing plutonium at this site, relocation will remove this activity from an area of urban expansion. This action provides DOE the opportunity to improve overall efficiencies of plutonium handling and to reduce overhead costs by consolidation of these activities at an existing DOE site (e.g., the Savannah River Plant, Idaho National Engineering Laboratory, or Pantex). Furthermore, relocation may also diminish concerns over transportation safety. The combination of these factors, rather than any one factor, make the relocation of this plant attractive. The capital investment required for the relocated plant is estimated at \$3.3 billion. Additional operating funds of \$1.2 billion and \$1.6 billion will be required for transition and D&D of the current site, respectively.
- o Upgrade plutonium and other facilities at RFP as necessary to provide a continuing supply of essential weapons components until the relocated RFP activities are fully operational in new facilities at the selected DOE site. Of particular importance is the upgrading of the Plutonium Recovery Facility, Building 371, to provide the interim capability essential for the recycle and recovery of plutonium from retired weapons.
- o Transfer nuclear materials activities at the Mound Plant to other DOE facilities that currently have nuclear materials operations. Although the Mound nuclear facilities could be upgraded and operated effectively and safely, relocation of the limited nuclear material activities is prudent in view of the growing population density near the plant and the growing concern of the public about such operations. The Plant's primary mission is production of small explosive devices. This and other nonnuclear activities can remain at the current site. The capital investment required for relocating the nuclear material operations is estimated at \$180 million. Additional operating costs of \$75 million are required for transition of operations.

5.4 Defense Waste Management: The Complex has a considerable waste backlog accumulated during the past 40 years that requires treatment for final disposition. Large quantities continue to be generated.

Finding:

DOE is approaching the transition from waste accumulation and interim storage to the processing and permanent geologic disposal of wastes. The defense waste management costs through the year 2010 are estimated

to be \$25 billion for these activities, including DOE's contribution to the commercial waste repository fee. This represents an increase of \$7.5 billion above the FY 1989 appropriation level accumulated over the 21-year period.

Recommendations:

- o Continue to implement the waste management program plan that includes the use of the Waste Isolation Pilot Plant in 1989; the Savannah River Plant Defense Waste Processing Facility in 1990; the Hanford Waste Vitrification Facility in 1999; and the Idaho Waste Immobilization Facility in about 2010. These programs will allow the Complex to move in an orderly manner from interim storage to permanent disposal.
- o Initiate modern and aggressive waste minimization programs to reduce future waste generation and waste backlog.

5.5 Verification and Control Technology (V&CT): The V&CT program coordinates the formulation and development of DOE positions relating to arms control initiatives and fulfills DOE responsibilities in energy, nuclear weapons, and treaty-related intelligence. A supporting activity is research and development of systems and technologies for monitoring nuclear-related treaties and for collecting nuclear-related intelligence.

Finding:

Arms control will be an increasingly important element of national security policy.

Recommendation:

Expand the traditional V&CT programs as appropriate over the next decade to support the increased emphasis on arms control, verification, and their intelligence requirements and apply the broad technological assets of the Complex to research and development in support of these national objectives.

5.6 Environment, Safety, and Health: The ES&H activity, which is not part of environmental restoration, consists of the ongoing environmental, safety, and health base program that is integrated within the operations of the Complex. It also involves corrective actions to upgrade active facilities and sites of the Complex to meet current federal and state laws and requirements. Because of its advanced age and the rapidly changing environmental, safety, and health regulations and standards, the Nuclear Weapons Complex is highly vulnerable to interruption of its operations. Temporary shutdowns of some key facilities are now in progress to accommodate corrective actions that will achieve compliance with current standards. The cost of the base program and corrective actions through FY 2010 is estimated to be \$25 billion. This is highlighted to indicate the funding required for ES&H corrective actions and base program; however, this amount is included in the funding identified for the major programs listed in Section 2 and should not be added separately.

Finding:

In light of the vulnerabilities of the Complex to interruption of operations for environmental, safety, and health deficiencies, a more aggressive program to correct these deficiencies is required than is currently funded.

Recommendation:

Increase the level of funding to successfully complete all actions needed to ensure production. Provide level funding thereafter as the environmental, safety, and health needs are accommodated by modernization of the Complex's facilities.

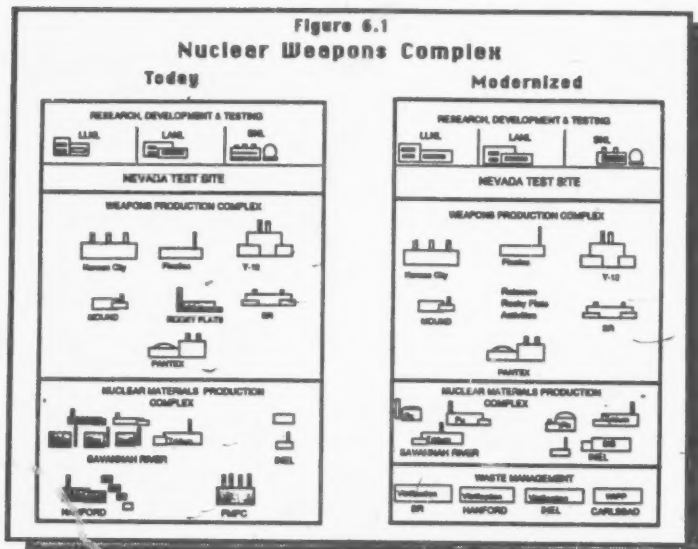
6. THE MODERNIZATION PLAN

The previous sections described the condition of the current Complex, defined requirements for modernizing the Complex, and presented specific findings and recommendations for achieving modernization. The configuration of the future Complex resulting from these findings and recommendations, as it is envisioned in the year 2010, is described briefly in this section. Also described is the plan for achieving the modernized configuration; specifically, the key modernization actions, their priority and timing, and the resources required to implement the plan. *A significant commitment to modernize the Complex must be made now and must be continued into the future.*

The proposed plan represents the Administration's best vision of an uncertain future. As discussed subsequently, many recommended actions, such as construction of new reactor capacity, are essential and time-critical for every reasonable future scenario envisioned and must be taken immediately. Other actions are less time-critical and can be deferred to allow future events and conditions to unfold and to help levelize the cost of modernization. Thus, the proposed modernization plan will be a dynamic plan that will be tested against unfolding events and periodically adjusted as future events dictate.

6.1 Nuclear Weapons Complex of the Future: Key features of the modernized Complex are illustrated in Figure 6.1 in contrast to the current Complex. The four principal characteristics that will distinguish the modernized Complex from that of today are:

- o New facilities to produce and process nuclear materials;
- o Consolidation or relocation of activities that use nuclear materials to larger, more remote DOE sites and closeout of unnecessary facilities;
- o Larger margin of safety and environmentally sound operations with emphasis on long-term solutions (rather than expedencies); and
- o Continuous upgrading of the Technology Base Program and of the associated R&D facilities to respond to a dynamic threat.



A more detailed discussion of these characteristics follows.

Modernized Research, Development, and Testing Complex: The RD&T complex in the year 2010 will comprise three national laboratories (Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories) to design and build prototypic weapons, to test weapons, and to certify the weapons stockpile until the weapons are retired. The complex will also include the Nuclear Test Site for underground nuclear testing and the Tonopah Test Range. The RD&T complex for the year 2010 will continue to fulfill its primary mission of modernizing the nuclear stockpile to meet DoD requirements and to sustain an effective and credible nuclear deterrent. Emphasis will be placed on exploring technological limits of evolving nuclear weapons technology, improving the U.S. defense posture, reducing the impact of new weapon technology developed by adversaries, and assessing the impact of potential limitations of nuclear test restrictions and arms control.

The three laboratories will provide the Nation's only weapons technology base with the capability for:

- o Underground nuclear testing, as may be required to accommodate laboratory responsibilities;
- o Applied nuclear research and development to maintain the Nation's nuclear deterrent;
- o Engineering of nuclear weapons systems;
- o Developing technology in scientific disciplines important to nuclear weapons; and
- o Maintaining technological superiority to avoid any surprise by the Nation's adversaries.

Modernized Nuclear Materials Production Complex: The modernized NMPC will comprise two major reactor production sites located either at the preferred sites of SRP and the Idaho National Engineering Laboratory (INEL) or at some other site. All future tritium and virgin plutonium production activities as well as most of the fuel/target cycle supporting activities will be concentrated at these two large, remote sites. The new complex will be more streamlined (two major sites versus four today) and cost effective, will be configured to meet a variety of possible DoD missions, will possess the systems needed to comply with ES&H and S&S regulations and requirements, and will apply modern processing and materials handling techniques to achieve higher efficiencies and employee protection in operations.

The SRP is the preferred site to operate the new HWR, one of two preferred reactor technologies, to produce the tritium required to support the weapons stockpile. If this site is approved, the infrastructure at SRP to support the new HWR will be modernized and streamlined by: (1) phasing out obsolete and unneeded facilities and activities, such as the three existing reactors, and consolidating fuel reprocessing operations into one of the existing separations areas to reduce costs; (2) replacing old, obsolete facilities, such as fuel fabrication and tritium separations facilities; and (3) renovating and upgrading needed existing facilities. SRP will have the capability to produce and process virgin WG plutonium, if needed.

The new MHTGR, other preferred technology, and its supporting infrastructure will be built and operated to ensure an uninterrupted supply of tritium and provide a capability for potential production of WG plutonium. The preferred site is INEL. The new SIS plant will be operated to convert existing DOE-owned, fuel-grade plutonium to WG plutonium as needed for the stockpile and for a contingency reserve. Operation of the Idaho Chemical Processing Plant to recover HEU from spent naval fuel for production reactor feedstocks will continue at INEL.

Production operations at the Hanford site will be phased out in the mid-1990s after the fuel-grade and WG plutonium is recovered from N Reactor fuels and residue materials, unless additional production facilities are located there. Defense Programs missions that will be continued at Hanford are Defense Waste Management (high-level waste and transuranic waste immobilization), site cleanup, and D&D. Likewise, production operations at the FMPC will be discontinued in the early 1990s.

Modernized Nuclear Weapons Production Complex: The modernized NWP Complex will retain the functions of the current complex but with some functions consolidated into other existing DOE sites. A significant change in the complex will be the relocation of all operations from the Rocky Flats Plant (RFP) to other DOE facilities.

The RFP operations include fabrication of plutonium and uranium alloy parts, fabrication and assembly of conventional metal components, operation of foundries, and recovery of plutonium from retired weapons and plutonium scrap. Plutonium operations will be moved to existing large DOE sites for consolidation and/or for reduction of transportation requirements. Other RFP operations may accompany the plutonium operations or be transferred to other DOE sites.

The modernization efforts at the other NWP sites are designed to ensure reliability of operations, decrease maintenance costs, increase productivity, reduce inventories, and bring the plants into compliance with current standards for safety, health, and environmental protection. Modernization will include: (1) replacement of 30- and 40-year-old buildings and utilities; (2) consolidation and reconfiguration of operations; (3) upgrading of manufacturing facilities and equipment utilizing today's best technology, such as computer-integrated manufacturing; and (4) installation of new processes and facilities to process and safely dispose of all wastes.

Defense Waste Management Program: Major waste management facility and operational changes will be reflected in the modernized Complex. The Complex will still be generating high-level, low-level, and transuranic wastes (HLW, LLW, and TRU, respectively).

By the year 2010, it is possible that the generation of waste could be reduced by about 70 percent. This may be achievable through a coordinated waste minimization and avoidance effort for all Defense Program wastes.

The SRP Defense Waste Processing Facility will have converted the backlog of SRP HLW into a vitreous form acceptable for disposal at the national repository. Waste generated from the new production reactor expected to be built at SRP will be processed into final waste forms soon after generation. The Hanford Waste Vitrification Facility will be in operation to convert the inventory of accumulated HLW to a vitreous form. The Idaho Waste Immobilization Facility will be constructed and ready for operation by the year 2010 to convert the inventory of Idaho-calcined HLW into a form acceptable at the repository and to process waste generated after that time.

The TRU waste generated in the Complex will be processed, packaged, and transferred to the Waste Isolation Pilot Plant at Carlsbad, New Mexico. LLW will continue to be buried in engineered trenches subject to the development of alternative methods for disposal.

Thus, the modernized Complex will reflect significant achievements in the handling, treatment, and disposal of all categories of radioactive and mixed waste.

Operations Environment, Safety, and Health: The modernized Complex will have completed required near-term corrective actions (reactor safety, fire protection, radiation protection, industrial safety, hygiene, hazardous waste management, etc.) and will be in compliance with existing requirements. The Complex will have reached the point where ES&H activities will be carried out principally to maintain compliance already achieved and to comply with new laws and standards.

Environmental Restoration: The Complex will have had underway for 20 years a logical and technically sound program for environmental cleanup and decontamination and decommissioning. DOE will have addressed the majority of the priority environmental restoration needs with the exception of the Hanford site. Some of the Hanford problems (e.g., the single-shell tank waste) are very complex and require both institutional consideration and technological development for proper resolution. Shut down facilities at the Rocky Flats and Hanford sites will also be ready for incorporation into the Environmental Restoration Program.

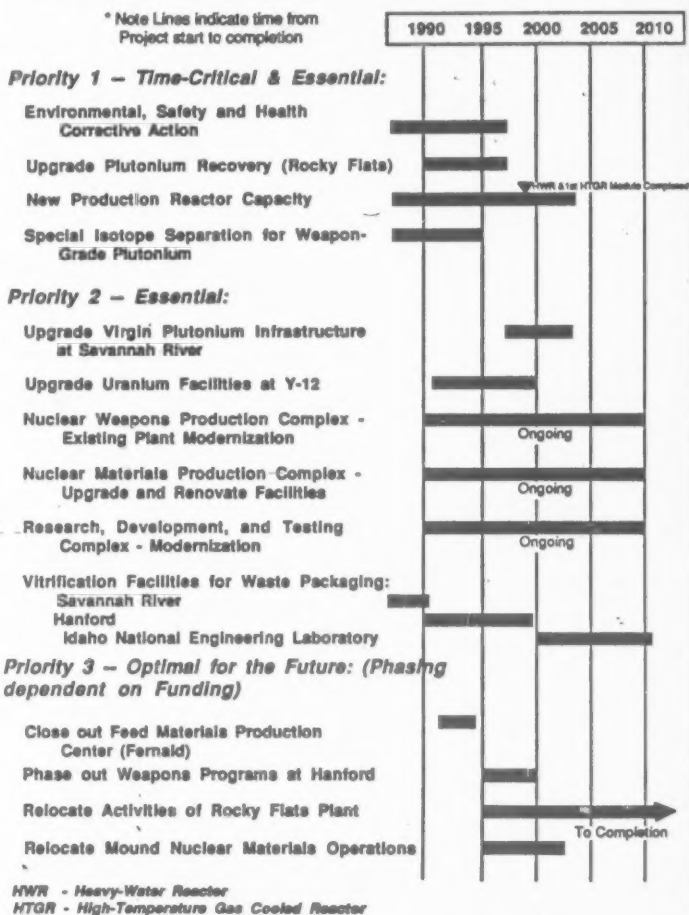
Safeguards and Security: The modernized Complex will have state-of-the-art safeguards and security technology and systems designed into its facilities.

6.2 Modernization Activities: The key modernization activities have been prioritized into three categories:

- o Priority 1 - those actions that are time-critical and essential to current operations;
- o Priority 2 - those actions essential for continued operations; and
- o Priority 3 - those actions needed to optimize the Complex for the future.

Figure 6.2 shows the schedules for initiation and completion of the major modernization activities. As indicated, the recommended new initiatives will be in place by the year 2010. Note that some activities are not shown because they represent a continuing level of effort without major milestone events definable at this time.

Figure 6.2
Priority and Schedule of Key Modernization Actions



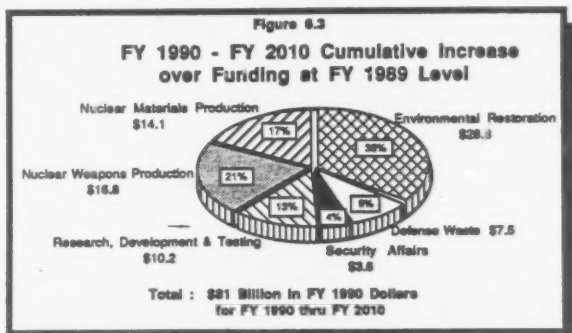
6.3 Transition Activities: In addition to the modernization actions described, other actions are currently being undertaken by DOE to address near-term issues. These actions are essential to permit a smooth transition to the modernized complex, to ensure that supply meets demand during the transition years, and to support development of advanced technologies. Major activities in this category include:

- o Establish a tritium reserve by producing tritium in the three existing SRP reactors while the NPRs are being constructed.
- o Conduct advanced planning and preparation for an interim tritium production capability that could be implemented in the event of a protracted outage of the current SRP reactors prior to operation of the first NPR. This includes limited preparation and continued maintenance of N Reactor in cold standby plus development and testing of high-temperature targets for light-water reactors.
- o Utilize existing facilities at several sites to recycle and recover plutonium from retired weapons and backlog scrap and process plutonium from existing spent fuel and other inventories.
- o Increase resource requirements for Environmental Restoration (environmental cleanup and decontamination and decommissioning). Thereafter, environmental cleanup resources remain at that level or increase if dictated by national priority considerations.
- o Augment research, development, and demonstration efforts in the areas of nuclear materials processing and handling, reactor fuel fabrication and advanced technology for tritium production.

6.4 Resource Plan: Resources to support modernization of the Nuclear Weapons Complex and to carry out its multiple missions have been estimated for the planning period (FY 1990 - FY 2010) and are presented here as a resource plan. The estimates in this Plan are presented in constant FY 1990 dollars and in terms of required budget authority (BA). The dollar values presented in this plan are not budget quality (i.e., detailed budgetary information was not developed), but represent a first-level approximation of costs and manpower requirements. The estimates are useful to identify future trends and levels of effort. (The annual budget process will be used to address the modernization activities in the usual level of detail for cost and scope justification.)

A varied approach has been taken in developing, analyzing, and consolidating the estimates of future resource needs. The estimates are presented by major cost category (e.g., operating and capital investment needs), and by major program (i.e., Nuclear Weapons, Nuclear Materials, and Security Affairs). In addition, they are analyzed in terms of requirements driving the funding levels (i.e., direct programmatic growth, regulatory responsibilities, and capital investment needs).

The estimates in the resource plan have been compared to the FY 1989 appropriation to indicate the increase in future funding levels that will be required to support the initiatives addressed in this study.* Large increases will be required over the next 21 years both to accomplish the missions and to modernize the Complex. Figure 6.3 shows a breakdown by program element of the funding amount above the FY 1989 level integrated over the entire period.



All demands for resources for the future Complex were considered whether or not they could be directly related to modernization. Competition for funding has necessitated difficult tradeoffs and prioritization of all requirements. During the recent period of approximately constant budgets (after accounting for normal inflation), the Nuclear Weapons Complex has absorbed the costs of enhancing its safeguards and security program and complying with changes in regulatory requirements for environment, safety, health, and waste management activities. *During the next 21 years, a sustained commitment to significant increases in funding is essential to accomplish modernization, environmental restoration, ES&H, and S&S objectives.*

The major factors that are driving the increases in resource requirements are programmatic growth, ES&H responsibilities, and capital investment in rebuilding the infrastructure of the Complex.

Programmatic Growth: Some growth in the RD&T program is required to ensure retention of superior staff in the laboratories to respond to a broad spectrum of uncertain technological futures and to assess the impact of further underground test restrictions and arms control agreements.

* The cost of modernization and environmental restoration in this report is expressed as the increment above the FY 1989 appropriated level summed over the 21-year period, FY 1990 - FY 2010.

Significant growth in the NMP program during the 1990s is required for procurement of HEU and for expanded operations at SRP. The increased SRP operating costs are associated with additional resources required to respond to the needs reflected by the external oversight groups (e.g., the National Academy of Sciences), to support the significant restoration activities, to increase maintenance, and to increase plutonium recovery from existing RFP scrap. The FMPC and Hanford phaseout in the mid-1990s counterbalance the growth in this period at INEL.

Some growth in the NWP Complex budget is required to support the nuclear deterrent and the long-range projection of the workload. However, production efficiencies resulting from the modernization effort should cause a decline in the average weapon cost.

Growth is also required in the Security Affairs funding levels to expand V&CT as well as the international safeguards program to ensure appropriate support of the national arms control initiatives.

The waste management funding level will increase over the current level to facilitate the transition from waste accumulation and interim storage to processing and permanent geologic disposal of wastes.

Environmental, Safety, and Health Responsibilities: Significant growth in funding levels will be required to ensure compliance with ES&H requirements. Examples include the following:

- o **ES&H Compliance/Corrective Actions:** The resource plan reflects an increased level of spending in the near term to implement ES&H corrective actions to ensure compliance with current federal and state laws and requirements and to avoid potential interference with essential activities of the Complex. Based on the FY 1989 funding level, \$21.6 billion (in FY 1990 dollars) would be spent over the period FY 1990 through FY 2010 for the ES&H base and corrective action programs. This base level has been increased by \$3.0 billion in this plan to \$24.6 billion.
- o **Waste Fee Payments:** Payment of the waste repository fee will amount to \$2.7 billion through FY 2010. Because this is not included in the FY 1989 appropriation, an increase in the funding level will be required to support payment of this fee.
- o **Environmental Restoration:** The costs of effectively addressing environmental restoration (ER) (environmental cleanup at sites in the Complex and decontamination and decommissioning of inactive facilities) will be significant as reported to Congress in the July 1988 report. Although the ER activity is not a part of the Modernization Plan, the cost is included in the resource plan for overall funding impact. DOE is in the process of putting in place a system for dealing with future ER activities (which will consider risk to the employee, the public, and the environment). ER funding has been gradually increased from the FY 1989 level to a level of \$1 billion a year by FY 1995. Funding for the post-1995 period is

assumed for planning purposes to increase to \$2.0 billion by the year 2000 and remain at the constant \$2.0 billion a year level until restoration is completed. The total ER growth over the FY 1989 level of spending for the period FY 1990 through FY 2010 is \$28.8 billion. The ER program will continue beyond FY 2010 until completed. The total estimated cost ranges from \$40 to \$70 billion.

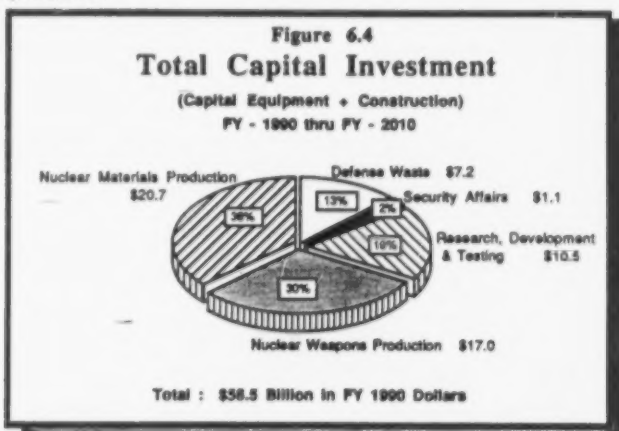
Capital Investment Needs: A total capital investment of about \$56.5 billion has been incorporated into the Plan. This exceeds by about \$25 billion the amount of capital that would be invested over the 21-year planning period if spending each year was at the FY 1989 level. Table 6.1 lists key capital projects in the Plan. They include \$16 billion for building two NPRs, upgrading the virgin plutonium infrastructure at Savannah River, completing the Special Isotope Separation (SIS) plant project, upgrading the Rocky Flats plutonium recovery capability, constructing waste vitrification and immobilization facilities, modernizing uranium facilities at the Y-12 Plant, providing new unique facilities to support expended verification and control technology activities, and building new facilities required to allow relocation of all Rocky Flats Plant operations and the Mound Plant nuclear materials operations to other DOE sites.

Table 6.1
Required Capital Investment

<u>Major Initiatives</u>	<u>Capital Investment</u> <u>FY 1990 - FY 2010</u>
Build Two New Production Reactors	\$8.8 Billion
Upgrade Plutonium Recovery Capability at Rocky Flats Plant	0.4
Complete SIS Project at INEL	0.5
Upgrade Virgin Plutonium Infrastructure at SRP	0.2
Modernize Uranium Facilities at Y-12 Plant	3.1
Construct Waste Vitrification / Immobilization Facilities at RL & ID	1.9
Build New Facilities for Relocation of Rocky Flats Plant	3.3
Provide Facilities to Relocate Mound Nuclear Material Operation	0.2
Provide Facilities and Equipment for Expanded V&CT Activities	0.8
Other Ongoing Capital Requirements:	
RO&T	10.8
NWP	11.0
N&P	13.4
D&M	8.3
SA	0.3
	<u>\$10.3</u>
	\$56.5 Billion

An additional \$40.3 billion has been included in the Plan to allow for renovations and modernization of existing facilities and equipment throughout the Complex. For the 21-year period (FY 1990 - FY 2010), an average annual capital investment rate of about \$1.9 billion per year will be required to ensure compliance with ES&H and S&S requirements, to preserve capabilities, and to modernize and optimize processes. The

FY 1989 appropriation level for capital in FY 1990 dollars is about \$1.4 billion. Figure 6.4 provides an overview of the total capital investment requirements.



Operating costs for the 21-year period are broken down in Figure 6.5 for the major program categories. Figure 6.6 provides a similar representation of total funding requirements (capital plus operating) identified in the Plan.

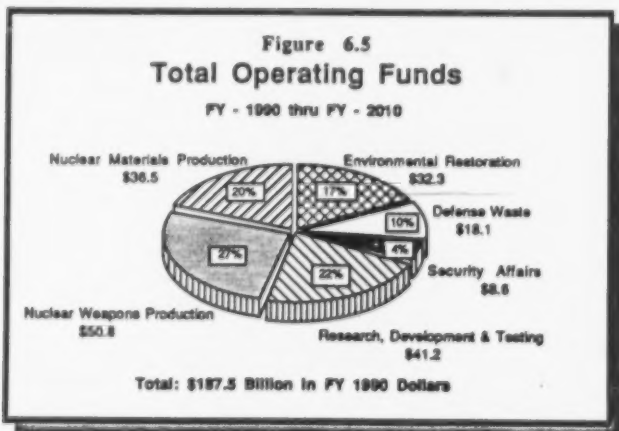
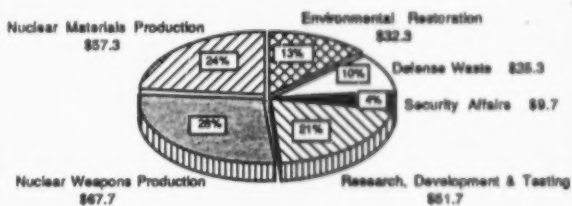


Figure 6.6
Total DP Funding

FY - 1990 thru FY - 2010



Total : \$244 Billion in FY 1990 Dollars

APPENDIX A

Identification of the Members of the
Steering Committee of the
Nuclear Weapons Complex Modernization Study

The Secretary of Energy established the Committee and appointed the following members:

- o Joseph F. Salgado, Deputy Secretary, Department of Energy, Committee Chairman
- o Troy E. Wade II, Acting Assistant Secretary for Defense Programs, Department of Energy
- o Ernest C. Baynard III, Assistant Secretary for Environment, Safety, and Health, Department of Energy
- o Robert B. Barker, Assistant to the Secretary of Defense for Atomic Energy
- o Linton F. Brooks, Director of Defense Programs and Arms Control, National Security Council
- o Philip R. Olson, Deputy Director for Strategy and Policy, Joint Chiefs of Staff

APPENDIX B

Facilities of the Nuclear Weapons Complex

The Nuclear Weapons Complex consists of 15 major facilities dispersed throughout the United States. These major facilities and their functions are given below:

B.1 Weapons Research, Development, and Testing (RD&T)

- o Lawrence Livermore National Laboratory (LLNL) is located at Livermore, California, and is operated by the University of California. Its principal role is the research and development of nuclear warheads, the design and testing of advanced technology concepts, and maintaining an innovative weapons design program. Approximately 65 percent of the work at LLNL is associated with the Nuclear Weapons Complex mission.
- o Los Alamos National Laboratory (LANL) is located at Los Alamos, New Mexico, and is operated by the University of California. Its principal role is the research and development of nuclear warheads, the design and testing of advanced technology concepts, and maintaining an innovative weapons design program. Approximately 60 percent of the work at LANL is associated with the Nuclear Weapons Complex mission.
- o Sandia National Laboratories (SNL), principal location at Albuquerque, New Mexico, is operated by AT&T Technologies, Inc. The major missions are nuclear weapons systems ordnance engineering, nonnuclear component design and development, field and laboratory testing, and manufacturing engineering.
- o Nevada Test Site (NTS) is located near Las Vegas, Nevada, and it is operated with multiple contractor organizations. The NTS is a remote, secure facility for safely conducting underground nuclear testing.

B.2 Nuclear Materials Production Facilities

- o Feed Materials Production Center (FMPC) is located at Fernald, Ohio, and is operated by the Westinghouse Electric Corporation. The facility produces uranium metal cores used in nuclear reactors at Hanford and the Savannah River Plant. Part of this complex is the RMI Company facility at Ashtabula, Ohio. RMI Company extrudes and forges castings produced at the FMPC.

- o Hanford is located near Richland, Washington. The Westinghouse Electric Corporation operates the material production operations, which include a fuel fabrication plant, one reactor designated the N-reactor (currently in cold standby), chemical separations, and a plutonium-finishing plant. In the past, tritium, plutonium shapes, and polonium-210 and other isotopes have been produced for use in the weapons complex.
- o Idaho National Engineering Laboratory (INEL) site is located in southern Idaho near Idaho Falls. Facilities at the site are operated by five major contractors. The principal Nuclear Materials Production Complex facility at INEL is the Idaho Chemical Processing Plant (ICPP) operated by the Westinghouse Electric Corporation, which recovers enriched uranium from spent naval and research reactor fuels.
- o Savannah River Plant (SRP) is located near Aiken, South Carolina, and is operated by E. I. du Pont de Nemours and Company. The primary function of the plant is the production of weapon-grade (WG) plutonium and tritium. Other activities at SRP include production of special isotopes and fabrication of naval reactor fuel material. The SRP's major nuclear materials production facilities include fuel and target fabrication facilities, three nuclear production reactors designated K, L, and P, two chemical separation plants, and a research and development laboratory to provide process support. Also, located at SRP is the Tritium Loading Facility (loading of boosting fuel into components) which is part of the Nuclear Weapons Production Complex.

B.3 Nuclear Weapons Production Facilities

- o Kansas City Plant is located in Kansas City, Missouri, and is operated by Allied-Signal Inc. The primary missions are manufacture, surveillance, and evaluation of components for nuclear weapons. The major products are electromechanical, electrical, plastic, and metallurgical components and arming, fuzing, and firing systems.
- o Mound Plant is located near Dayton, Ohio, and is operated by EG&G, Inc. The primary missions are manufacture, surveillance, and evaluation of components for nuclear weapons. These components include detonators, timers, transducers, firing sets, pellets, and unique production testers. Activities also included recovery and purification of tritium wastes. Earlier activities included manufacturing of polonium-210 and plutonium-238 radioisotopic heat sources. Approximately 70 percent of the work at Mound is associated with weapons production.
- o Pantex Plant is located near Amarillo, Texas, and is operated by Mason and Hangar-Silas Mason Company. The plant is primarily an assembly facility that assembles high explosives, nuclear components, and nonnuclear components into nuclear weapons. Other activities include weapon repair and modification, weapon disassembly and retirement, and stockpile evaluation and testing.

- o Pinellas Plant is located in Clearwater, Florida, and is operated by the General Electric Company. This plant produces miniaturized neutron generators. It also manufactures radioisotopically powered, thermoelectric generators; thermal batteries; specialty capacitors; crystal resonators; neutron detectors; special switches; and product testers.
- o Rocky Flats Plant (RFP) is located near Denver, Colorado, and is operated by the Rockwell International Corporation. The key facilities at the RFP are those associated with plutonium component fabrication and plutonium recovery. The plant also fabricates components from uranium, beryllium, and fabricates nonnuclear metal parts.
- o Y-12 Plant is located in Oak Ridge, Tennessee, and is operated by Martin-Marietta Energy Systems Inc. The major operations are production of weapon components, uranium, uranium alloys, and lithium compounds that are shipped to other sites. Materials are also recovered from the fabrication process and retired weapons.

B.4 Defense Waste Management

- o Waste Isolation Pilot Plant (WIPP) is located near Carlsbad, New Mexico, and is operated by the Westinghouse Electric Corporation. WIPP was built to provide a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from Defense Activities. It is expected to become operational in FY 1989.

MODERNIZATION OF NUCLEAR WEAPONS COMPLEX

Nuclear deterrence is one cornerstone of the Nation's national defense. This deterrence requires a modernized nuclear weapons complex to continue to be effective. A study was conducted to examine alternatives and develop options to achieve modernization which would permit operation of the facilities in a safe and environmentally acceptable manner. The December 15, 1988 report to Congress contains the recommended plan and investment strategy.

The four principal characteristics which will distinguish the modernized complex from that of today are:

New facilities to produce nuclear materials;

Consolidation of some activities that use nuclear materials and closeout of unnecessary facilities;

Larger margin of safety and environmentally sound operations with emphasis on long-term solutions; and

Continuous upgrading of the technology base program and the associated facilities to support nuclear deterrence.

The nuclear weapons stockpile does not exist in a static state but requires modernization to meet changing threats and to increase the safety and operational characteristics of the weapons. The cost of modernization is fifty-two billion dollars over the next twenty-one years. An additional twenty-nine billion dollars is planned for environmental restoration during this same period. (This does not include the full amount for environmental restoration since it will continue beyond the 21 year period.) These dollar amounts are expressed in constant FY 1990 dollars and are the increments above the FY 1989 appropriated level summed over the 21 year period, FY 1990 through FY 2010.

Attached is a listing of the major facilities which are located in twelve states together with the findings and recommendations that pertain to those facilities.

State of California

Lawrence Livermore National Laboratory

Facts: Location: Livermore, California
 Contractor: University of California
 Area: 631 Acres
 Started: 1952
 Approximate Employment: 8,000

Mission: Lawrence Livermore National Laboratory's (LLNL) primary mission is to perform the research, development, and testing associated with the nuclear design aspects of all phases of the nuclear weapon life cycle and associated national security activities. Other important missions at LLNL meet the following criteria: 1) significance to the weapons program, 2) sufficient size, importance and complexity to warrant the use of significant or unique laboratory capabilities, and 3) relative distinction from the research interests of the university and industrial sectors. Within this role, LLNL has developed expertise in inertial fusion, magnetic fusion, biomedical and environmental research, isotope separation, and applied energy technology. Principal program activities including those other than for the Defense Program:

Defense Programs (46%)	Biomedical/Environmental (2%)
Isotope Separation (11%)	Miscellaneous DOE Programs (5%)
Magnetic Fusion (9%)	Work for Others (16%)
Laser Fusion Energy (8%)	Department of Defense (12%)
Energy Programs (3%)	Others (4%)

Sandia National Laboratories, Livermore (SNLL)

In 1956 Sandia assumed the responsibility for ordnance systems engineering for weapon concepts originating at Lawrence Radiation Laboratory, now Lawrence Livermore National Laboratory. To accomplish this, the Sandia National Laboratory--Livermore (SNLL) was established as a branch of the laboratories in Albuquerque. The SNLL is situated adjacent to and south of LLNL on 92 acres. About 1100 full-time SNLL employees are located at the Livermore site.

Modernization Report: Pertinent Findings and RecommendationsFindings:

- o A vigorous RD&T program, staffed with outstanding scientists and engineers, is fundamental to maintaining the nuclear deterrent and must be strengthened to prepare for and respond to a wide spectrum of uncertain military, technical, and political futures.

- o Consolidation of the national weapons laboratories would not be cost effective. Instead, it would be counterproductive by limiting the technology base and by eliminating the benefits of peer review and competition of ideas and designs.

Recommendations:

- o Continue to provide the technology base at the three weapons R&D laboratories to maintain and modernize the stockpile and to pursue a vigorous applied research program to develop future weapon technology options.
- o Augment and restructure the nuclear test program such that it can adequately respond to the challenges facing the RD&T program in the future (particularly to maintain a modern nuclear weapons stockpile, explore advanced concepts for nuclear weapons, and to structure a physics program for investigations) that assess the impact of nuclear testing restrictions in accordance with Section 1436 of the National Defense Authorization Act for FY 1989.

Finding: Technical obsolescence, changing environmental, safety, and health requirements, and safeguards and security standards require ongoing replacement and modernization of facilities and equipment.

Recommendation: Establish a level of about four percent of the RD&T equipment and facilities replacement value per year as the appropriate annual capital investment rate. This amounts to \$10.5 billion over the 21-year planning period, which represents an increase of \$3.1 billion above the FY 1989 appropriation level accumulated over this period.

Finding: Arms control will be an increasingly important element of national security policy.

Recommendation: Expand the traditional Verification and Control Technology programs over the next decade to support the increased emphasis on arms control, verification, and their intelligence requirements and apply the broad technological assets of the Complex to research and development in support of these national objectives.

Finding: Approximately 30 years ago when work on weapons design began at the Livermore site, it was located in a relatively isolated area. However, during the intervening years, the population of nearby areas has increased significantly. Although nuclear materials have regularly been handled and processed at the Livermore site in a safe and secure manner, and at technically acceptable levels of risk, the possibility of increased public concern in the future cannot be ignored. Current mission assignments can be accomplished at existing facilities.

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Recommendation: Future plans for the Livermore site should include construction of new facilities at a more remote DOE site to accommodate any significant increase in nuclear material handling and processing at the Livermore site.

Discussion:

- c Some growth in the Weapons Research, Development, and Testing Program is projected to ensure retention of superior staff in the laboratories to respond to a broad spectrum of uncertain technological futures and to assure the impact of further underground test restrictions and arms control agreements.
- c Capital expenditures for LLNL and SNLL over the planning period are incorporated in the \$10.5 billion noted above.
- c LLNL will continue to pursue the development of the SIS technology for a plutonium isotope separation facility to convert fuel-grade plutonium to weapon-grade plutonium.

Current FY 1982 Budget:

<u>LLNL*</u>	<u>\$ Millions</u>
Operating	\$297.4
Capital	
Equipment	31.0
Construction	51.2
TOTAL	\$380.4

<u>SNLL*</u>	
Operating	\$112.2
Capital	
Equipment	10.9
Construction	18.1
TOTAL	\$141.2

*Funds for testing included in MTS funding level.

State of Colorado

- Rocky Flats Plant (RFP)

Facts: Location: Golden, Colorado
 Contractor: Rockwell International
 Area: 6,606 Acres
 Started: 1952
 Approximate Employment: 3,300

Mission: Fabrication and Assembly of:
 - Plutonium Components
 - Beryllium Components
 - Recovery and Reprocessing Plutonium
 - Uranium Alloy Components
 - Stainless Steel Components

Background: The RFP was initially constructed in 1951. It was a welcome addition to the local economy, providing a source of jobs for residents as well as the potential for new work for regional businesses. Over the years, the original facility has been expanded and modernized. As the plant has grown so has the Denver metropolitan area and today they exist in a closer physical relationship. A major fire in 1969 and the release of small amounts of tritium into a local community water reservoir in 1973 served to highlight the physical relationship. There is a vocal element in the area which is highly critical of the RFP operation. Further, several public officials from the state of Colorado have expressed concern regarding the future of this plant.

These external influences, together with opportunities to improve efficiencies and reduce transportation concerns, suggest that relocation of the RFP operation should be relocated.

Modernization Report: Pertinent Findings and Recommendations

Finding: The RFP was located in relatively isolated areas when first constructed. In the intervening years, the population of areas adjacent to both sites has increased significantly. A continued increase in the nearby population density is expected for both sites. These plants are being operated in a safe and environmentally acceptable manner at technically acceptable levels of risk to the public. Appropriate modernization should allow them to continue to do so. However, the public perception of risk is such that even insignificant incidents involving nuclear materials may result in major impacts on production.

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Recommendations:

- o Initiate the relocation of RFP activities in the next decade. The plant processes large amounts of plutonium which is the focus of local concern. Although new facilities that meet today's stringent criteria can be provided to continue processing plutonium at this site, relocation will remove this activity from an area of urban expansion. This action provides DOE the opportunity to improve overall efficiencies of plutonium handling and to reduce overhead costs by consolidation of these activities at an existing DOE site. Furthermore, relocation may also diminish concerns over transportation safety. The combination of these factors, rather than any one factor, make the relocation of this plant attractive. The capital investment required for the relocated plant is estimated at \$3.3 billion. Additional operating funds of \$1.2 billion and \$1.6 billion will be required for transition and D&D of the current site, respectively.
- o Upgrade plutonium and other facilities at RFP as necessary to provide a continuing supply of essential weapons components until the relocated RFP activities are fully operational in new facilities at the selected DOE site. Of particular importance is the upgrading of the Plutonium Recovery Facility, Building 371, to provide the interim capability essential for the recycle and recovery of plutonium from retired weapons.

Candidate Sites for Relocation:

- o Savannah River Plant
- o Idaho National Engineering Laboratory
- o Pantex

Modernization Costs:

	Capital
	<u>\$ Billions</u>
Modernization Costs at RFP	(FY 1990 Dollars)
Modernization Cost Avoidance	\$2.76
(relocation)	<u>1.55</u>
TOTAL COLORADO MODERNIZATION COST	\$1.21

Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$375.6
Capital	
Equipment	21.1
Construction	<u>34.0</u>
TOTAL	\$430.7

State of Florida

Pinellas Plant

Facts: Location: Largo, Florida
Contractor: General Electric
Area: 99.2 Acres
Started: 1957
Approximate Employment: 1,800

Mission: Fabrication, Assembly, and Procurement of:

- Neutron Generators
- Specialty Capacitors
- Product Testers
- Miscellaneous Small Components
- Lightning Arrestor Connectors
- Specialty Switches
- Thermal Batteries
- Radioisotopic Thermoelectric Generators

Background: The General Electric Company (GE) constructed and operated the Pinellas Plant to manufacture electronic components under a subcontract with Sandia Corporation. The facility was occupied in January 1957. Five months later, the Atomic Energy Commission (AEC) exercised its option to purchase the plant and GE continued operation under a direct contract with the AEC. The plant is located in the center of Pinellas County, about midway between Clearwater and St. Petersburg, Florida.

Modernization Report: Pertinent Findings and Recommendations

Finding: Significant modifications of the Nuclear Weapons Production Complex (NWP) infrastructure must be made over the next two decades to ensure continued viability and cost effectiveness. The primary problems of the NWP Complex (including Pinellas) are the result of aging facilities and the need for ES&H upgrades.

Recommendation: Provide a continuing annual investment of about four percent of the facilities' replacement value for essential equipment and facilities to modernize the NWP Complex so that capability is maintained and increased efficiencies are achieved. This amounts to \$13.5 billion in capital funds over the 21-year period (FY 1990-FY 2010) for maintaining the production viability to meet projected DoD requirements. This

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represents an increase of about \$6 billion above the FY 1989 appropriation level accumulated over the 21-year period.

Discussion:

Of the \$13.5 billion capital funds to modernize the Nuclear Weapons Complex, \$370 million (FY 1990 dollars) will be required to modernize the Pinellas Plant through FY 2010.

The Pinellas Plant is located in a relatively high-density population area. In the future, no radioactive process or the handling of radioactive materials will take place at the Plant. All requirements for handling any hazardous materials and other safety requirements will continue to be met to assure that the facility is operated in a safe, secure, and environmentally acceptable manner.

Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$100.6
Capital	
Equipment	5.1
Construction	<u>8.4</u>
TOTAL	\$114.1

State of Idaho

Idaho National Engineering Laboratory (INEL)

Facts:

Location:	Southeastern Idaho (between Idaho Falls and Arco)
Principal Contractors:	EG&G Idaho, Inc. Westinghouse Idaho Nuclear Company
Area:	890 Square Miles (570,000 Acres)
Started:	1949
Approximate Employment:	8,000
Primary Facilities:	14; 3 in direct support of NWC

Mission: Since 1953, the Idaho Chemical Processing Plant (ICPP), a major Defense Programs facility, has recovered uranium from spent nuclear fuels, largely from government-owned reactors. The major fuel load will continue to be the irradiated naval reactor cores. At the ICPP site, high-level waste is calcined to a solid and stored in bins for ultimate disposition. The radioactive waste management complex (RWMC) processes and stores radioactive waste (low-level and transuranic waste) generated in national defense and research programs.

Modernization Report: Pertinent Findings and Recommendations

Finding: The future supply and demand relationship for plutonium is much more uncertain and has much larger potential variations than for tritium. Meeting future requirements and providing adequate contingency capability will require a multiplicity of supply sources during the planning period. During the next five to six years, additional plutonium must be supplied by its recovery from the residue backlog and from inventories of irradiated targets and fuel. In the long term, additional production capability will be needed to ensure that potential plutonium requirements can be met.

Recommendation: Construct a Special Isotope Separation (SIS) plant at INEL, the preferred site, to convert DOE inventories of fuel-grade plutonium into weapon-grade (WG) plutonium. Operation of the SIS will ensure that plutonium requirements for the 10-year period beyond FY 1995 can be met and will provide a long-term contingency capability.

Finding: Modernization will require renovation and retrofitting of existing facilities, introduction of new and improved process technologies, construction of a few new or

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replacement facilities, consolidation of activities into fewer facilities, and phasing out operations in unneeded or non-cost-effective facilities. The production reactors are currently the most vulnerable part of the NMP Complex. Replacement with new capability is urgent and essential to ensure an uninterrupted supply of tritium for long-term support of the stockpile.

Recommendations: Construct two new production reactors (NPRs) at two sites to satisfy the goals of redundancy, diversity, and site duality for tritium production, as recommended to Congress by the Secretary of Energy. The estimated cost of acquiring the two NPRs is \$7.9 billion, including about \$6.6 billion in capital.

One NPR should be a modernized version of the current low-temperature, Heavy-Water Reactor (HWR). The preferred site for this reactor is the Savannah River Plant near Aiken, South Carolina.

The other NPR should be a Modular, High-Temperature Gas-Cooled Reactor (MHTGR). The preferred site is the Idaho National Engineering Laboratory. It is to be sized at about 50 percent of the new HWR's tritium capability to provide capacity for preproduction of tritium for contingency purposes and for sufficient makeup tritium for maintaining the stockpile in case of a protracted loss of the HWR. It will be of an advanced design with features, such as inherent safety, that would be desirable in the next generation of power reactors. In this way, the MHTGR would serve several national goals: tritium contingency in the case of an outage of the HWR; tritium production to allow Savannah River to support limited production of other essential nuclear materials such as WG plutonium; capability for potential production of WG plutonium; and demonstration of an advanced reactor concept. Fuel and target fabrication, head-end fuel reprocessing, and tritium extraction facilities are to be built to support the MHTGR.

Upgrade and renovate essential facilities of the nuclear materials program to meet modernization objectives, including productivity improvements and operating cost savings. A continuing investment of about four percent per year of the facilities' replacement value will be needed. This amounts to about \$14 billion over the 21-year period, which represents an increase of about \$4 billion above the FY 1989 appropriation level accumulated over this period.

Finding: The Rocky Flats Plant (RFP) was located in a relatively isolated area when first constructed. In the intervening years, the population of areas adjacent to

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to the site has increased significantly. A continued increase in the nearby population density is expected for both sites. This plant is being operated in a safe and environmentally acceptable manner at technically acceptable levels of risk to the public. Appropriate modernization should allow it to continue to do so. However, the public perception of risk is such that even insignificant incidents involving nuclear materials may result in major impacts on production.

Recommendation: Initiate the relocation of RFP activities in the next decade. This action provides DOE the opportunity to improve overall efficiencies of plutonium handling and to reduce overhead costs by consolidation of these activities at an existing DOE site (e.g., the Savannah River Plant, Idaho National Engineering Laboratory, or Pantex). Furthermore, relocation may also diminish concerns over transportation safety.

Discussion:

- o During the planning period, INEL will continue with its primary mission to receive, store, and process fuel, and handle radioactive waste.
- o The estimated capital cost for the MHTGR is \$3.4 billion. The estimated capital cost for the SIS is \$0.5 billion.
- o INEL is a potential candidate site for the relocation of the Rocky Flats Plant. The capital investment required for the relocated plant is \$3.4 billion. The relocation is expected to be completed by FY 2010.
- o Waste management operations will continue through the planning period. TRU waste stored at INEL will be transferred to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, when WIPP becomes available to receive waste.
- o Upgrading of DP facilities at INEL will continue, however, new major facilities, such as Fast and New Waste Calciner, have been constructed and operated within the last 10-year period. A new processing/waste treatment project (Fuel Processing Restoration) is currently underway. The construction of the INEL vitrification facility for high-level waste packaging will be initiated at the turn of the century.

Current FY 1989 Budget:

	\$ Millions		
	NMP	DWM	Total
Operating	96.3	66.5	162.8
Capital			
Equipment	7.2	7.3	14.5
Construction	63.6	14.4	78.0
TOTAL	167.1	108.2	275.3

State of Missouri

Kansas City Plant (KCP)

Facts: Location: Kansas City, Missouri
Contractor: Allied/Signal Corporation
Area: 122.1 Acres
Started: 1949
Approximate Employment: 7,100

Mission: Fabrication, Assembly, and Procurement of:
- Mechanical Components
- Electrical Components
- Rubber Components
- Electromechanical Components
- Electronic Devices
- Plastics

Background: In May 1942, the U.S. Navy constructed a factory in Kansas City, Missouri, in which Pratt-Whitney manufactured aircraft engines for the World War II effort. In November 1948, the Atomic Energy Commission selected a portion of this existing site for the Kansas City Plant to produce electrical and mechanical components in support of the nuclear weapons program and the Bendix Corporation was selected as the operating contractor. In February 1983, Bendix became a wholly-owned subsidiary of the Allied Corporation. The plant is currently operated by the Allied/Signal Corporation.

Modernization Report: Pertinent Findings and Recommendation

Finding: Significant modifications of the facilities must be made over the next two decades to ensure continued viability and cost effectiveness. The primary problems of the Nuclear Weapons Production (NWP) Complex (including KCP) are the result of aging facilities and the need for environmental, safety and health upgrades.

Recommendation: Provide a continuing annual investment of about four percent of the facilities' replacement value for essential equipment and facilities to modernize the KCP so that capability is maintained and increased efficiencies are achieved. This amounts to \$13.5 billion in capital funds over the 21-year period (FY 1990-FY 2010) for maintaining the production viability to meet projected DoD requirements. This represents an increase of about \$6 billion above the FY 1989 appropriation level accumulated over the 21-year period.

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Discussion of Activities at KCP:

- o Of the \$13.5 billion required to modernize the NWP Complex, it is estimated that \$2.1 billion will be required through 2010 to preserve and modernize the capability of the KCP.
- o Relocating or closing the plant has been evaluated but does not appear to be economical.
- o The current grouping of products and processes at KCP is functionally efficient. However, some fine-tuning may be appropriate to focus and simplify responsibilities for specific products, but this would not have a large cost impact.
- o Some electronics manufacture/assembly activities at KCP could be purchased from vendors. This may result in a size reduction at KCP. The plant would still maintain in-house expertise to assist vendors, to qualify product, and to provide limited backup production capability. The KCP mission assignments may not be altered, but the direct production work force could be affected.

Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$418.7
Capital	
Equipment	21.1
Construction	<u>12.4</u>
TOTAL	\$452.2

State of Nevada

Nevada Test Site

Facts: Location: Sixty-five miles N.W. of Las Vegas, Nevada
 Principal Contractors: EG&G, Inc.
 Fenix and Scisson, Inc.
 Holmes and Narver, Inc.
 Reynolds Electrical and
 Engineering Co., Inc.
 Wackenhut Services, Inc.
 Holmes and Narver, Inc.

Area: 1,350 Square Miles
 Started: 1950
 Approximate Employment: 8,400

Mission: The Nevada Test Site (NTS) was chosen as a continental proving ground in 1950 to reduce the expense and logistical problems of testing in the Pacific. The primary mission of NTS is to provide a remote, secure facility for the safe conduct of underground nuclear testing in support of national defense programs. NTS contractors have developed unique expertise in fields such as big hole drilling, mining and downhole diagnostics in support of the weapons development laboratories and the Department of Defense. In addition, the site has been expanded to include many other programs and projects, including waste management; geologic, hydrologic, hydrologic and seismic investigations; biological and medical experiments to study plant and animal life in a radiation environment; and the investigation of the effects of liquid gaseous fuel spills. The NTS activities also include operation of a medical and environmental monitoring program in the Marshall Islands of the Central Pacific. The NTS Yucca Flats site has been designated for site characterization as a commercial repository for high-level waste. Defense Programs (DP) high-level waste is to be disposed in a DOE national waste repository. DP waste management budgets include a waste fee for this purpose.

Nuclear Weapon Activities: There are two principal types of nuclear weapons tests conducted at NTS: weapon-related tests and weapon-effects tests.

Testing is conducted during four stages of weapon development: primary experimental research, theoretical investigations and calculations, components development experimentation, and full-scale proff-testing. Most tests involve developmental devices conceived and furnished by Los Alamos National Laboratory and Lawrence Livermore National Laboratory, with nonnuclear contributions by Sandia National Laboratories.

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The other major test site activities include supporting Defense Advanced Research Projects Agency Field Command military effects tests.

Modernization Report: Pertinent Findings and Recommendations

Finding: Technical obsolescence, changing environmental, safety, and health requirements, and safeguards and security standards require ongoing replacement and modernization of facilities and equipment.

Recommendation: Establish a level of about four percent of the RD&T equipment and facilities replacement value per year as the appropriate annual capital investment rate. This amounts to \$10.5 billion over the 21-year planning period, which represents an increase of \$3.1 billion above the Fiscal Year (FY) 1989 appropriation level accumulated over this period.

Finding: A vigorous RD&T program, staffed with outstanding scientists and engineers, is fundamental to maintaining the nuclear deterrent and must be strengthened to prepare for and respond to a wide spectrum of uncertain military, technical, and political futures.

Recommendation: Augment and restructure the nuclear test program such that it can adequately respond to the challenges facing the RD&T program in the future that assess the impact of nuclear testing restrictions in accordance with Section 1436 of the National Defense Authorization Act for FY 1989.

Discussion:

- o Capital expenditures for NTS over the planning period are incorporated in the \$10.5 billion noted above.

Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$536.8
Capital	
Equipment	51.1
Construction	<u>34.8</u>
TOTAL	\$622.7

State of New Mexico

Sandia National Laboratories (Albuquerque)

Facts: Location: Albuquerque, New Mexico
Contractor: AT&T Technologies, Inc.
Area: 7,422 Acres
Started: 1948
Approximate Employment: 7,200

Mission: The Albuquerque Sandia National Laboratories (SNLA) mission is research, development, and engineering of nuclear weapons systems except for the nuclear explosive. This includes nuclear weapons systems ordnance engineering, nonnuclear component design and development, field and laboratory testing, and manufacturing engineering. SNLA also conducts energy research and development.

Background: Prior to the Trinity shot in 1945, the Manhattan Project established a small facility on Sandia Base (now Kirtland AFB) to perform ordnance engineering, nonnuclear atomic bomb assembly, and military training. Both the military and LASL has employees on this base, and in March 1948 the Sandia Laboratory was established as a formal branch of LASL. In 1949, Sandia Corporation was organized as a wholly-owned subsidiary of the Western Electric Company, who took over laboratory operation under a nonprofit, no-fee contract in November 1949. Approximately 1,700 LASL employees were transferred to the new payroll. After the divestiture of AT&T in 1984, Sandia Corporation became a wholly-owned subsidiary of the AT&T Technologies Corporation.

The Sandia National Laboratories (SNL) consists of the headquarters facilities in Albuquerque, the laboratory facility in Livermore, California (SNLL), the Tonopah Test Range (TTR) in Nevada, and several quality assurance teams located in weapons production plants.

Modernization Report: Pertinent Findings and RecommendationsFindings:

- o A vigorous RD&T program, staffed with outstanding scientists and engineers, is fundamental to maintaining the nuclear deterrent and must be strengthened to prepare for and respond to a wide spectrum of uncertain military, technical, and political futures.

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- o Consolidation of the national weapons laboratories would not be cost effective. Instead, it would be counterproductive by limiting the technology base and by eliminating the benefits of peer review and competition of ideas and designs.

Recommendations:

- o Continue to provide the technology base at the three weapons R&D laboratories to maintain and modernize the stockpile and to pursue a vigorous applied research program to develop future weapon technology options.
- o Augment and restructure the nuclear test program such that it can adequately respond to the challenges facing the RD&T program in the future (particularly to maintain a modern nuclear nuclear weapons stockpile, explore advanced concepts for nuclear weapons, and to structure a physics program for investigations) that assess the impact of nuclear testing restrictions in accordance with Section 1436 of the National Defense Authorization Act for FY 1989.

Finding: Technical obsolescence, changing environmental, safety, and health requirements, and safeguards and security standards require ongoing replacement and modernization of facilities and equipment.

Recommendation: Establish a level of about four percent of the RD&T equipment and facilities replacement value per year as the appropriate annual capital investment rate. This amounts to \$10.5 billion over the 21-year planning period, which represents an increase of \$3.1 billion above the FY 1989 appropriation level accumulated over this period.

Finding: Arms control will be an increasingly important element of national security policy.

Recommendation: Expand the traditional Verification and Control Technology programs over the next decade to support the increased emphasis on arms control, verification, and their intelligence requirements and apply the broad technological assets of the Complex to research and development in support of these national objectives.

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Discussion:

- o Some growth in the Weapons Research, Development, and Testing program is projected to ensure retention of superior staff in the laboratories to respond to a broad spectrum of uncertain technological futures and to assess the impact of further underground test restrictions and arms control agreements.
- o Capital expenditures for SNLA over the planning period are incorporated in the \$10.5 billion noted above.

Current FY 1989 Budget:*

	<u>\$ Millions</u>
Operating	\$427.6
Capital	
Equipment	30.2
Construction	<u>42.6</u>
TOTAL	\$500.4

*Funds for testing included in NTS funding level.

State of New Mexico

Los Alamos National Laboratory

Facts: Location: Los Alamos, New Mexico
 Contractors: University of California
 Area: 27,280 Acres
 Started: 1943
 Approximate Employment: 8,000

Mission: The primary mission of the Los Alamos National Laboratory (LANL) is the application of science and technology to problems of national security, including the maintenance of a strong defense, the fulfillment of arms controls commitments and the guarantee of a secure energy supply for the future. LANL also undertakes multidisciplinary fundamental and applied research. Principal program activities, including other than those for Defense Programs, are:

Weapons (46%)	Nuclear Energy (2%)
Nuclear Physics (6%)	Basic Energy Sciences (2%)
Nuclear Materials	Miscellaneous DOE
Production (5%)	Programs (7%)
Magnetic Fusion (3%)	Work for Others (21%)
Verification and Control (3%)	Nuclear Regulatory
Safeguards (2%)	Commission (2%)
Conservation and Renewable	Department of Defense (14%)
Energy (2%)	Others (5%)

Modernization Report: Pertinent Findings and RecommendationsFindings:

- o A vigorous RD&T program, staffed with outstanding scientists and engineers, is fundamental to maintaining the nuclear deterrent and must be strengthened to prepare for and respond to a wide spectrum of uncertain military, technical, and political futures.
- o Consolidation of the national weapons laboratories would not be cost effective. Instead, it would be counterproductive by limiting the technology base and by eliminating the benefits of peer review and competition of ideas and designs.

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Recommendations:

- o Continue to provide the technology base at the three weapons R&D laboratories to maintain and modernize the stockpile and to pursue a vigorous applied research program to develop future weapon technology options.
- o Augment and restructure the nuclear test program such that it can adequately respond to the challenges facing the RD&T program in the future (particularly to maintain a modern nuclear weapons stockpile, explore advanced concepts for nuclear weapons, and to structure a physics program for investigations) that assess the impact of nuclear testing restrictions in accordance with Section 1436 of the National Defense Authorization Act for FY 1989.

Finding: Technical obsolescence, changing environmental, safety, and health requirements, and safeguards and security standards require ongoing replacement and modernization of facilities and equipment.

Recommendation: Establish a level of about four percent of the RD&T equipment and facilities replacement value per year as the appropriate annual capital investment rate. This amounts to \$10.5 billion over the 21-year planning period, which represents an increase of \$3.1 billion above the FY 1989 appropriation level accumulated over this period.

Finding: Arms control will be an increasingly important element of national security policy.

Recommendation: Expand the traditional Verification and Control Technology programs over the next decade to support the increased emphasis on arms control, verification, and their intelligence requirements and apply the broad technological assets of the Complex to research and development in support of these national objectives.

Discussion:

- o Some growth in the Weapons Research, Development, and Testing program is projected to ensure retention of superior staff in the laboratories to respond to a broad spectrum of uncertain technological futures and to assess the impact of further underground test restrictions and arms control agreements.

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- o Capital expenditures for LANL over the planning period are incorporated in the \$10.5 billion noted above.

Current FY 1989 Budget:*

	<u>\$ Millions</u>
Operating	\$299.9
Capital	
Equipment	31.9
Construction	<u>56.8</u>
TOTAL	\$388.6

*Funds for testing are included in NTS funding level.

New Mexico

Waste Isolation Pilot Plant (WIPP)

Facts: Location: About 30 miles east of Carlsbad
Contractor: Sandia National Laboratories -
scientific support
Westinghouse - management and
operations support
Bechtel - architectural and
engineering services for facility
design and inspection
Area: 36 square miles
Started: 1973 - exploratory drilling
1981 - construction begun
Approximate Employment: 600 (1987)

Mission: The WIPP is constructed to store transuranic waste from DOE defense program activities. Also, experiments with defense high-level wastes will be conducted; the wastes will be retrieved at the end of the experiments. (Transuranic wastes are expendable items, such as gloves, coveralls, paper wipes, x-ray film and some tools which have come in contact with small amounts of radioactive elements above uranium in the Periodic Table of Elements.)

Background: WIPP is authorized by Public Law 96-164 to provide a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the U.S., and is exempt from regulation by the Nuclear Regulatory Commission.

By April 1979 the Draft Environmental Impact Statement (DEIS) was revised after public hearings and receipt of written comments. The Final Environmental Impact Statement (FEIS) was released in October 1980. By January 1981 DOE issued the record of decision following the FEIS, allowing the project to proceed, and actual construction began in mid-1981 when the Bureau of Land Management and DOE signed an agreement allowing use of the federally-owned land.

DOE and the State of New Mexico's Environmental Evaluation Group (EEG) have been operating under a consultation and cooperation agreement since 1981. The purpose of the agreement is to designate key WIPP events, set time frames for review, comments and resolution of comments, and establish procedures for review and resolution of problems.

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The WIPP is planned to be in use in 1989. The TRU wastes will remain retrievable for the first five years of WIPP's operation, after which time a decision will be made regarding the permanent disposal of TRU waste at WIPP.

Modernization Report: Pertinent Findings and Recommendations:

Finding: DOE is approaching the transition from waste accumulation and interim storage to the processing and permanent geologic disposal of wastes. The defense waste management costs through the year 2010 are estimated to be \$25 billion for these activities, including DOE's contribution to the commercial waste repository fee. This represents an increase of \$7.5 billion above the FY 1989 appropriation level accumulated over the 21-year period.

Recommendations:

- o Continue to implement the waste management program plan that includes the use of the Waste Isolation Pilot Plant in 1989;....
- o Increase waste management funding (including the amortization of the waste fee) from the current level of \$814 million to an average of \$1.25 billion in the early 1990s to facilitate the transition and provide level funding thereafter.
- o Initiate modern and aggressive waste minimization programs to reduce future waste generation and waste backlogs.

Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$69.4
Capital	
Equipment	17.9
Construction	2.6
TOTAL	\$89.9

State of Ohio

Fernald Feed Materials Production Center (FMPC)

Facts: Location: Fernald, Ohio
 Contractor: Westinghouse Materials Company of
 Ohio
 Area: 1050 Acres
 Started: 1951
 Approximate Employment: 1,500

Mission: Provides uranium metal for DOE facilities at Oak Ridge, Tennessee, and Rocky Flats, Colorado, but most of the production has been devoted to the production of uranium ingots and rods for the Hanford and Savannah River reactors, respectively. Since the Hanford N Reactor has been placed in a stand down mode, the reactor fuel program is currently directed to the Savannah River reactor needs.

Background:

- o The history of operations and current condition of the FMPC has been the subject of much review in the Government and the public media.
- o The DOE has recognized the characteristics of the current situation with the FMPC and is in the process of addressing the problems and issues.
- o The Modernization Study evaluated the present and future role of the FMPC relative to its basic need in support of the Nuclear Weapons Complex. The Study Findings and Recommendations address this approach.
- o The Modernization Plan recognizes that potentially large decommissioning and decontamination efforts at FMPC will be required, however, the details of these efforts are to be addressed more appropriately in the DOE "December ES&H Report."

Modernization Report: Pertinent Findings and Recommendations

Finding: The FMPC at Fernald is severely deteriorated and the projected workload is decreasing. It would be cost effective to transfer its remaining functions.

Recommendation: Close out the FMPC facilities in the near term (early 1990s) to avoid cost of expensive renovations. Consideration should be given to preproduction of depleted uranium materials for military and nuclear materials production

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programs. Any remaining tasks should either be relocated to another DOE site or contracted with a commercial vendor.

Discussion:

- o Because the production missions for the FMPC are forecast to be terminated in the early 1990s, in accordance with the assumptions of the study, the Modernization Plan recommends shutting down the FMPC facilities and focusing on the environmental restoration programs at the site. This recommendation raises the longer-term issue of depleted uranium (DU) target supply for possible resumption of weapon-grade plutonium production in the Savannah River Plant reactors before 1999 and in the near heavy-water reactor post-1999. Very likely, a commercial vendor could supply the DU targets, if they are needed. There has been very little detailed investigation of this option to date. A more definitive study of the procurement process for these targets, including verification of commercial capabilities and willingness will be performed.
- o Cost trade-offs considering the "buy" option showed that purchase from commercial sources and relocation of the needed capability to another DOE site were comparable. It has been estimated that these services could be procured for about \$620 million between 1993 and 2010, assuming that a nominal 500 kg Pu were produced each year. Because of the uncertainty of the amount of plutonium required from this supply source, this estimate is on the high side.

Candidate Sites for Relocation:

- o Savannah River
- o Y-12 Plant at Oak Ridge

Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$87.6
Capital	
Equipment	9.4*
Construction	82.4
TOTAL	\$179.4

*Majority of these funds represent ES&H activities.

D&D: As production operations at the FMPC are closed out, it is expected that D&D activities would proceed and, therefore, off-set or more than off-set the funding required for the production of uranium metal. D&D funding requirements are estimated to be \$2 billion.

State of Ohio

Mound Plant

Facts: Location: Miamisburg, Ohio
Contractor: EG&G Mound Applied Technologies
Area: 306.6 Acres
Started: 1948
Approximate Employment: 2,200

Mission: Fabrication, Assembly, and Procurement:

- Detonators
- Explosively Activated Timers
- Calorimeters
- Radioisotope Thermoelectric Generators

Conduct:

- Boost/Explosive Surveillance
- Pyrotechnic Devices
- Explosive Firesets
- Isotopic Heat Sources

Modernization Report: Pertinent Findings and Recommendations

Finding: The Mound Plant was located in a relatively isolated area when first constructed. In the intervening years, the population of areas adjacent to the site has increased significantly. A continued increase in nearby population density is expected. The plant is being operated in a safe and environmentally acceptable manner at technically acceptable levels of risk to the public. Appropriate modernization should allow it to continue to do so. However, the public perception of risk is such that even insignificant incidents involving nuclear materials may result in major impacts on the Plant's primary functions.

Recommendation: Transfer nuclear materials activities at the Mound Plant to other DOE facilities that currently have nuclear materials operations. Although the Mound nuclear facilities could be upgraded and operated effectively and safely, relocation of the limited nuclear material activities is prudent in view of the growing population density near the plant and the growing concern of the public about such operations. The Plant's primary mission is production of small explosive devices. This and other nonnuclear activities can remain at the current site. The capital investment required for relocating the nuclear materials operations is estimated at \$180 million. Additional operating costs of \$7.5 million are required for transition.

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Nuclear Materials Workload at Mound:

- o Tritium - 20 percent direct and direct support
- o Plutonium - 6 percent direct and direct support

Candidate Sites for Relocation:

- o Tritium - Savannah River
- o Plutonium - Savannah River/Hanford

Modernization Costs:

	Capital
	\$ Millions
	(FY 1990 Dollars)
Total Plant	\$841
Modernization Cost Avoidance (with relocation)	- 65
Net Modernization Cost	\$776

Current FY 1989 Budget:

	\$ Millions
Operating	\$113.8
Capital	26.0
Equipment	13.5
Construction	12.5
TOTAL	\$139.8

State of South Carolina

Savannah River Plant (SRP)

Facts: Location: 12 Miles South of Aiken, South Carolina
 Contractor: du Pont de Nemours (current)
 Area: 300 Square Acres
 Started: Site selection - 1950
 Construction - 1951 (completed - 1956)
 Operations - 1952
 Approximate Employment: 9,500 (excludes construction)

Mission: Production of nuclear materials for nuclear weapons, primarily plutonium, tritium, and heavy water (deuterium). The mission over the years has broadened to include the production of other isotopes, such as Pu-238. Savannah River's production activities also include the loading of tritium containers for the nuclear weapons, reclamation of tritium containers and the purification of tritium recovered from retired weapons.

Background: The decision in 1950 to go ahead with SRP was driven by the perceived need for tritium in the fusion weapon program following President Truman's directive of January 31, 1950 to develop a thermonuclear weapon (the "super"). While production of tritium in the Hanford reactor had been demonstrated, the new plant at Savannah River was necessary to avoid serious curtailment in the production of plutonium at Hanford for the fission program. If thermonuclear weapons proved unfeasible or tritium requirements turned out to be less than anticipated, as indeed was the case, the construction of SRP was further justified on the following grounds; to increase plutonium production, to provide a higher efficiency in the use of uranium ore, to provide security against attack of the Hanford reactors, and to be replacement reactors in the event of retirement of older Hanford reactors.

Five reactors were constructed; one has been in standby since 1964. Two chemical processing plants, a tritium extraction, purification, and loading facility, and a high-level waste solidification facility comprise the major elements of the Defense Program operations and facilities at the SRP. Currently, the C Reactor is shut down because of cracking in the reactor vessel; the other reactors (P, K, and L) are also shutdown for safety reviews and upgrading.

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Modernization Report: Pertinent Findings and Recommendations

Finding: The near-term supply of tritium is at risk because of the safety-related issues with existing SRP reactors.

Recommendation: Complete essential safety and other improvement to the SRP reactors to allow their restart, increase their power, decrease unscheduled maintenance outage time, and ensure continued production over the next decade.

Finding: Modernization will require renovation and retrofitting of existing facilities, introduction of new and improved process technologies, construction of a few new or replacement facilities, consolidation of activities into few facilities, and phasing out operations in unneeded or non-cost-effective facilities. Replacement with new capability is urgent and essential to ensure an uninterrupted supply of tritium for long-term support of the stockpile.

Recommendations:

- o Construct two new production reactors (NPRs) at two sites to satisfy the goals of redundancy, diversity, and site duality for tritium production, as recommended to Congress by the Secretary of Energy. The estimated cost of acquiring the two NPRs is \$7.9 billion, including about \$6.6 billion in capital.

One NPR should be a modernized version of the current Low-Temperature, Heavy-Water Reactor (HWR), because it has the highest level of technical and production assurance (lowest uncertainties). The preferred site for this reactor is SRP where the infrastructure exists to support tritium production as well as the production of WG plutonium and other isotopes.

Most of the fuel/target cycle and other facilities supporting the production reactors at SRP can be renovated and retrofitted to meet a future reactor production mission at that site. Consolidation of the two separation areas into one area should be undertaken to reduce operating costs. A few facilities, such as fuel fabrication and tritium extraction and purification, will require replacement in the 1990s to meet long-term mission requirements.

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- o Upgrade and renovate essential facilities to meet modernization objectives, including productivity improvements and operating cost savings. A continuing investment of about four percent per year of the facilities' replacement value will be needed. This amounts to about \$14 billion over the 21-year period, which represents an increase of about \$4 billion above the FY 1989 appropriation level accumulated over this period.

Finding: The future supply and demand relationship for plutonium is much more uncertain and has much larger potential variations than for tritium. Meeting future requirements and providing adequate contingency capability will require a multiplicity of supply sources during the planning period.

Recommendation: Modernize the plutonium infrastructure at SRP to provide capability beyond FY 2000 to process limited quantities of virgin plutonium from the new HWR, if needed.

Finding: The Rocky Flats Plant (RFP) and the Mound Plant were located in relatively isolated areas when first constructed. In the intervening years, the population of areas adjacent to both sites has increased significantly. A continued increase in the nearby population density is expected for both sites. These plants are being operated in a safe and environmentally acceptable manner at technically acceptable levels of risk to the public. Appropriate modernization should allow them to continue to do so. However, the public perception of risk is such that even insignificant incidents involving nuclear materials may result in major impacts on production.

Recommendations:

- o Initiate the relocation of RFP activities in the next decade. This action provides DOE the opportunity to improve overall efficiencies of plutonium handling and to reduce overhead costs by consolidation of these activities at an existing DOE site (e.g., the Savannah River Plant, Idaho National Engineering Laboratory, or Pantex). Furthermore, relocation may also diminish concerns over transportation safety.
- o Transfer nuclear materials activities at the Mound Plant to other DOE facilities that currently have nuclear materials operations. Although the Mound nuclear facilities could be upgraded and operated effectively and safely, relocation of the limited nuclear material activities is prudent in view of the growing population density near the plant and the growing concern of the public about such operations. The Plant's primary mission is production of small explosive devices. This and other nonnuclear activities can remain at the current site.

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Transition Activity:

- o Establish a tritium reserve by producing tritium in the three existing SRP reactors.
- o Utilize existing facilities at several sites (including SRP) to recycle and recover plutonium from retired weapons and backlog scrap and process plutonium from existing spent fuel and other inventories.

Discussion:

- o The SRP NPP capital cost is estimated to be \$3.2 billion.
- o Upgrade and renovation activities for NMP facilities will include replacement of some facilities at SRP such as the tritium extraction and purification facility.
- o Consolidation of five processing operations at SRP and modernization of the plutonium infrastructure is estimated to require \$175 million for capital projects.
- o SRP is a potential candidate site for the relocation of the Rocky Flats Plant. The capital investment required for the relocated plant is \$3.4 billion. The relocation is expected to be completed by FY 2010.
- o SRP is a potential candidate site for the relocation of the Mound tritium workload. All tritium operations at Mound could be relocated to SRP in 6 to 9 years for an estimated cost of \$185 million.

Current FY 1989 Budget:

	<u>\$ Millions</u>			<u>Total</u>
	<u>NWP</u>	<u>NMP</u>	<u>DWP</u>	
Operating	60.2	763.1	242.8	1,066.1
Capital				
Equipment	4.5	67.4	7.5	79.4
Construction	<u>31.8</u>	<u>116.6</u>	<u>125.2</u>	<u>273.6</u>
TOTAL	96.5	947.1	375.5	1,419.1

State of Tennessee

Oak Ridge Y-12 Plant

Facts: Location: Oak Ridge, Tennessee
Contractors: Martin-Marietta Corporation
Area: 805 Acres
Started: 1947
Approximate Employment: 5,900

Mission: Fabrication and Assembly of:
o Uranium Components Fabrication
o Precision Machined Components
o Specialty Subassembly
o Lithium Components Fabrication
o Processing and Inspection of
Specialty Components

Background: The Y-12 Plant was built originally as part of the Manhattan Project to separate and concentrate uranium-235 isotopes by the electromagnetic process. With the successful demonstration of the more efficient gaseous diffusion process, the plant was modified to carry out other weapons production operations. Today, the Y-12 Plant is a major nuclear weapons production plant.

The Union Carbide Nuclear Division of the Union Carbide Corporation operated the plant until April 1, 1984, when Union Carbide was replaced by Martin Marietta Energy Systems, Inc., as the operating contractor for this facility.

Modernization Report: Pertinent Findings and Recommendations

Finding: Significant modifications of the Nuclear Weapons Production Complex infrastructure must be made over the next two decades to ensure continued viability and cost effectiveness. The primary problems of the NWP Complex are the result of aging facilities and the need for environmental, safety and health upgrades.

Recommendation: Provide a continuing annual investment of about four percent of the facilities' replacement value for essential equipment and facilities to modernize the NWP Complex so that capability is maintained and increased efficiencies are achieved. This amounts to \$13.5 billion in capital funds over the 21-year period (FY 1990-FY 2010) for maintaining the production viability to meet projected DoD requirements. This

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represents an increase of about \$6 billion above the FY 1989 appropriation level accumulated over the 21-year period.

Discussion:

- o The \$13.5 billion in capital funds, required to modernize the Nuclear Weapons Complex, includes a major capital initiative totalling \$2.1 billion to modernize the uranium facilities at the Y-12 Plant.
- o The estimated total cost to modernize the Y-12 Plant is \$5.6 billion through FY 2010.

Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$393.4
Capital	
Equipment	32.0
Construction	<u>55.9</u>
TOTAL	\$481.3

State of Texas

Pantex Plant

Facts: Location: Amarillo, Texas
Contractor: Mason & Hangar-Silas Mason Company
Area: 10,177 Acres
Started: 1951
Approximate Employment: 2,600

Mission: - Fabrication, Assembly, and Procurement of High Explosives
- Final Assembly of Weapons
- Weapon Repair, Modification, Disassembly and Retirement

Background: The Pantex Plant is located about 17 miles northeast of Amarillo, Texas. In 1951, following a survey of World War II ordnance facilities, the AEC selected Pantex for chemical explosives fabrication and final assembly of nuclear weapons. Over the years, Pantex has absorbed the functions of the decommissioned Burlington Iowa Plant and the Medina and Clarksville modification centers. Originally operated by Procter & Gamble, Pantex has been operated by Mason & Hangar-Silas Mason Company, Inc., since 1956.

Modernization Report: Pertinent Findings and Recommendations

Finding: Significant modifications of the facilities must be made over the next two decades to ensure continued viability and cost effectiveness. The primary problems of the NWP Complex are the result of aging facilities and the need for environmental, safety, and health upgrades.

Recommendation: Provide a continuing annual investment of about four percent of the facilities' replacement value for essential equipment and facilities to modernize NWP Complex (including the the Pantex Plant) so that capability is maintained and increased efficiencies are achieved. This amounts to \$13.5 billion in capital funds over the 21-year period (FY 1990-FY 2010) for maintaining the production viability to meet projected DoD requirements. This represents an increase of about \$6 billion above the FY 1989 appropriation level accumulated over the 21-year period.

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Finding: The Rocky Flats Plant (RFP) and the Mound Plant were located in relatively isolated areas when first constructed. In the intervening years, the population of areas adjacent to both sites has increased significantly. A continued increase in the nearby population density is expected for both sites. These plants are being operated in a safe and environmentally acceptable manner at technically acceptable levels of risk to the public. Appropriate modernization should allow them to continue to do so. However, the public perception of risk is such that even insignificant incidents involving nuclear materials may result in major impacts on production.

Recommendation: Initiate the relocation of RFP activities in the next decade. This action provides DOE the opportunity to improve overall efficiencies of plutonium handling and to reduce overhead costs by consolidation of these activities at an existing DOE site (e.g., the Savannah River Plant, Idaho National Engineering Laboratory, or Pantex). Furthermore, relocation may also diminish concerns over transportation safety.

Discussion of Activities at Pantex:

- o Of the \$13.5 billion in capital funds to modernize the NWP Complex, it is projected that about \$1.7 billion will be required through 2010 to preserve and modernize the capability of the Pantex Plant.
- o Relocating or closing the plant has been evaluated but does not appear to be economical.
- o The current grouping of products and processes at the Pantex Plant is functionally efficient.
- o Pantex is a potential candidate site for the relocation of the Rocky Flats Plant. The capital investment required for the relocated plant is \$3.4 billion. The relocation is expected to be completed by FY 2010.

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Current FY 1989 Budget:

	<u>\$ Millions</u>
Operating	\$130.8
Capital	
Equipment	11.0
Construction	<u>38.1</u>
TOTAL	\$179.9

State of Washington

The Hanford Site

Facts: Location: Richland, Washington
Contractor: Westinghouse Hanford Co.
Area: 507 Acres
Started: 1943
Approximate Employment: 9,000 (Defense Programs)

Mission: The original Manhattan Project mission of the Hanford Works was the production of plutonium. While this has remained a key responsibility, the Hanford mission has broadened considerably into the development of advanced nuclear power concepts commercial, waste management, and other areas of research and development.

Background: In early 1943, the Hanford site was selected by the U.S. Army Corps of Engineers' Manhattan Engineer District to build larger versions of the Fermi (Chicago) and Clinton (Oak Ridge) piles to produce plutonium. Work on the first production reactor, the B-Reactor, was begun on June 7, 1943. The reactor began operation in September 1944, and the first irradiated slugs were discharged on December 25, 1944.

A total of nine production reactors were built with the last being the N-Reactor, a dual purpose reactor producing plutonium and byproduct steam for commercial generation of electricity. Five chemical processing plants were constructed and operated; the PUREX Plant replaced the previous four facilities. From 1949 to 1965, Hanford fabricated nuclear warhead components from plutonium metal. The Plutonium Finishing Plant (Z Plant) has been used to convert the chemical separations plant plutonium product to metal or oxide and has also been utilized to recover plutonium from scrap materials. A major activity at Hanford has been the handling and treatment of high-level, low-level, and TRU waste generated from the production operations over a period spanning 45 years.

Modernization Report: Pertinent Findings and Recommendations

Finding: The Hanford site will not have a Nuclear Materials Production mission much beyond the time that N Reactor is removed from cold standby unless additional production facilities are located there.

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Recommendation: Complete the processing of onsite N Reactor fuel and plutonium through PUREX Plant and the Plutonium Finishing Plant within four to five years followed by the phase out of all Hanford NMP facilities to effect cost savings. Continue waste management operations throughout the planning period.

Transition Activities: Other actions are currently being undertaken by DOE to address near-term issues. These actions are essential to permit a smooth transition to the modernized complex, to ensure that supply meets demand during the transition years, and to support development of advanced technologies. Major activities in this category include:

- o Conduct advanced planning and preparation for an interim tritium production capability that could be implemented in the event of a protracted outage of the current Savannah River Plant reactors prior to operation of the first new production reactor. This includes limited preparation and continued maintenance of N Reactor in cold standby plus development and testing of high-temperature targets for light-water reactors.
- o Utilize existing facilities at several sites (including those at Hanford) to recycle and recover plutonium from retired weapons and backlog scrap and process plutonium from existing spent fuel and other inventories.

Discussion:

- o The N Reactor is currently in a stand down (cold standby) mode.
- o The PUREX Plant and Plutonium Finishing Plant continue to operate utilizing the current inventory of irradiated fuel.
- o Waste management operations will continue through the planning period. For the period through FY 2010 it is estimated that funds totalling about \$16 billion will be required for the Hanford radioactive waste program. This will include the construction and operation (FY 1999) of the Hanford Waste Vitrification Plant.

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Current FY 1989 Budget:

	<u>\$ Millions</u>		
	<u>NMF</u>	<u>DWP</u>	<u>Total</u>
Operating	294.4	168.8	463.2
Capital			
Equipment	15.2	16.0	31.2
Construction	<u>7.7</u>	<u>46.8</u>	<u>54.5</u>
TOTAL	317.3	231.6	548.9

Environment, Safety, and Health Needs of The U.S. Department of Energy

Volume 1: Assessment of Needs



December 1988

U.S. Department of Energy

Washington, DC 20585

FOREWORD

The Department of Energy is strongly committed to meeting its energy, technology, and national security responsibilities in a manner that also fulfills the public trust and meets the Department's obligations for worker and public safety and for protection of the environment. The Department considers complying with environmental, safety, and health requirements to be an integral part of maintaining operations of its facilities. As part of this commitment, it is the Department's policy that all activities of the Department and its contractors shall comply with the letter and spirit of applicable Federal, state, and local environmental, safety, and health statutes, regulations, and standards.

The Department has taken significant actions in recent years to fulfill this commitment:

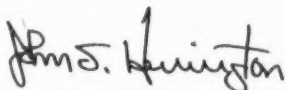
- Ongoing, day-to-day environmental, safety, and health activities at each site have been greatly expanded to ensure that current operations comply with applicable requirements.
- The position of Assistant Secretary for Environment, Safety, and Health has been established with sufficient resources to conduct a vigorous, independent oversight program and with authority to shut down facilities.
- An Advisory Committee for Nuclear Facility Safety has been established to provide independent perspective of the safety and health status of the Department's nuclear facilities and operations.
- In-depth technical reviews are being conducted to establish, for the first time, a comprehensive baseline of the environmental and safety status of the Department's facilities and operations. The reviews include a Department-wide survey and ranking of existing and potential environmental problems and technical safety appraisals to evaluate all aspects of safety at the Department's nuclear facilities.
- Environmental remedial actions within each of the Department's program organizations are being consolidated.
- Each facility and program in the Department has identified environment, safety, and health activities and resources needed to bring all facilities and operations into full compliance with applicable regulations and requirements and clean up contamination from past operations.

With this report, the Department takes another important stride forward by identifying the activities and projected resources needed to achieve and maintain compliance with environmental, safety, and health requirements and objectives.

At the same time, the Department is moving aggressively to implement corrective actions to address identified environmental, safety, and health deficiencies and to prevent development of

future problems. The Department also is proceeding to assess, characterize, and clean up environmental contamination from past operations. These cleanup activities will be conducted in close cooperation with the U.S. Environmental Protection Agency and appropriate state and local agencies.

Progress is, in short, being made. While more remains to be done at significant cost, the record shows that the Department is moving aggressively to address environmental, safety, and health concerns. The end result of this work will be a stronger foundation for the Department to accomplish its important mission in the future and a tangible commitment to conducting its operations in a manner that is safe and environmentally sound, and that protects the health and safety of the Department's employees and the public.

A handwritten signature in dark ink, appearing to read "John S. Herrington". The signature is written in a cursive, somewhat stylized script.

John S. Herrington
United States Secretary
of Energy

Washington, D.C.
December 1988

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SUMMARY

This report identifies the activities and estimates the associated resources needed for Department of Energy (DOE) facilities and operations to achieve and maintain compliance with current environmental, safety, and health requirements and standards. This assessment of activity and resource needs is based on data submitted by individual DOE field and program offices. This is not a planning document, and detailed analyses of the needs, along with prioritization, validation, funding, and program planning, are outside the scope of this report.

The Department's environmental, safety, and health needs include base program activities, corrective actions, remedial actions, and other environmental, safety, and health activities. *Base program* activities include the routine, day-to-day operations designed to ensure that active DOE facilities are operated in a safe and environmentally sound manner consistent with departmental policies and directives. Base program activities include environmental, safety and health, and waste management activities. Through the year 2010, the average annual resource needs for the base program activities are projected to be \$1.8 billion, including \$0.4 billion for environmental activities, \$0.6 billion for safety and health activities, and \$0.8 billion for the radioactive waste management base program.

Corrective actions are discrete activities to bring operating facilities into compliance with environmental, safety, and health requirements and objectives. Environmental corrective actions include projects to bring management of air emissions, liquid discharges, and solid waste into full compliance with environmental requirements, including those established pursuant to the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, the Toxic Substances Control Act, and the Atomic Energy Act. Thirty-one of the 45 DOE sites included in this report identified a need for environmental corrective actions.

Safety and health corrective actions have been divided into three categories based on the types of facilities involved: nuclear reactor facilities, non-reactor nuclear facilities, and non-nuclear facilities. Key areas of focus for safety and health corrective actions include radiation protection and safety upgrades, asbestos management, fire protection improvements, and ventilation system improvements. A prime undertaking in this area is a spectrum of corrective actions directed toward ensuring the safety of all the Department's nuclear reactors and other hazardous nuclear facilities. In addition, current activities include implementing new safety objectives for all nuclear facilities, conducting a risk-based approach for helping to ensure safety through risk assessments focused on potential vulnerabilities to severe accidents, and performing seismic analyses and testing to help identify and implement any needed structural and component upgrades. These activities could result in additional resource needs for corrective actions. Twenty-seven of the 45 sites identified safety and health corrective action needs.

Environmental remedial actions involve assessment, characterization, and cleanup of existing environmental contamination resulting from releases of hazardous and radioactive substances during previous facility operation or waste management activities. Remediation may involve efforts to clean up the soil, surface water, or groundwater, including stabilization or removal, treatment, and disposal of bulk wastes. Remedial action needs were identified by 37 of the 45 sites.

Other environmental, safety, and health activities being conducted by the Department include (1) efforts to decontaminate and decommission (D&D) inactive facilities previously involved in the handling or processing of nuclear materials for DOE programs and (2) discrete projects to safely manage radioactive wastes generated by DOE programs. Twenty

of the 45 sites identified D&D and/or waste management project needs. The DOE also is responsible for several special remedial action and decontamination and decommissioning projects at inactive sites and facilities and contaminated vicinity properties. These special projects include the Surplus Facilities Management Program, the Formerly Utilized Sites Remedial Action Project, the Uranium Mill Tailings Remedial Action Project, and the West Valley Demonstration Project. Many of the sites and facilities involved in these special projects were used in the past by the DOE or its predecessor agencies; others were privately operated and have been assigned by Congress to DOE for remediation.

The projected resources needed to carry out the various corrective, remedial, and "other" environmental, safety, and health activities total \$53.4 billion to \$91.7 billion (see Figure S.1). These projections include \$7.1 billion to \$14.2 billion for corrective actions, \$35.4 billion to \$64.0 billion for environmental remedial actions, and \$10.9 billion to \$13.5 billion for "other" environmental, safety, and health activities.

It should be noted that the Department's overall program to manage radioactive wastes generated in the DOE's defense-related programs includes (1) the waste management base program to treat, store, and dispose of the existing waste and continue research and development efforts to identify improved management technologies, (2) discrete projects to provide for the transition from storage to permanent disposal for high-level and transuranic wastes, and (3) placement of high-level wastes in the planned geologic repository.

The projected resource needs for this overall radioactive waste management program total \$22 billion to \$23 billion. These totals include resource needs for completion of the individual waste management projects and for the waste management base program activities through the year 2010 (including \$3.2 billion of the high-level repository fee). To avoid double counting of needs, however, environmental, safety, and health base program activities and corrective actions associated with radioactive waste management are excluded.

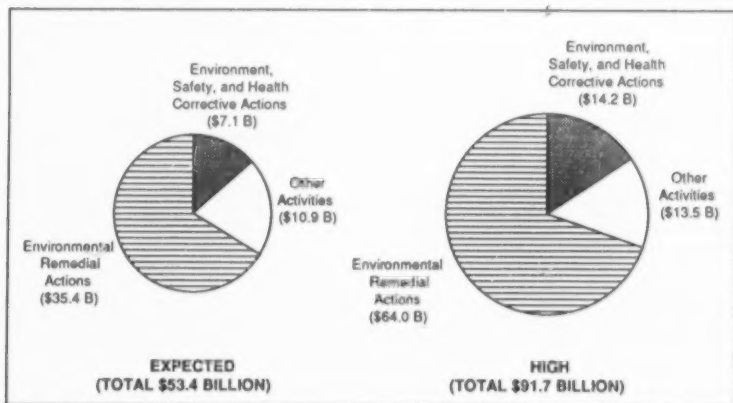


FIGURE S.1: PROJECTED DOE ENVIRONMENTAL, SAFETY, AND HEALTH NEEDS ABOVE BASE PROGRAM

1. INTRODUCTION

The Department of Energy (DOE) is committed to conducting its operations in a manner that ensures the safety and health of DOE workers and the public and protects the environment. This report identifies the Department's environmental, safety, and health needs to fulfill these commitments.

The DOE is subject to a highly complex and evolving set of Federal, state, and local laws, standards, and regulations designed to control health, safety, and environmental risks. These requirements set limits on the types and concentrations of materials that can be emitted to the air, water, and land; set safety and health standards; establish programs to clean up hazardous conditions; and in general seek to protect human safety and health and environmental quality for current and future generations.

The age of some DOE facilities is an important factor in the Department's efforts to comply with current environmental, safety, and health requirements. The standards and regulations in effect when many of the DOE facilities were designed and built have been revised significantly, thus requiring major modification or replacement of some facilities to meet current standards and regulatory requirements. Furthermore, the DOE is responsible for numerous sites with potential environmental contamination, including inactive hazardous waste disposal sites from past operations.

The DOE has been steadily increasing its emphasis on environmental, safety, and health activities since 1985. These include base program activities, corrective actions, remedial actions, and "other" environmental, safety, and health activities. The base program consists of routine, day-to-day activities designed to ensure that active DOE facilities are operated in a safe and environmentally sound manner con-

sistent with current environmental, safety, and health requirements. The base program also includes day-to-day activities associated with routine waste management operations. Environmental, safety, and health corrective actions are nonroutine, discrete activities undertaken at active sites and facilities to achieve compliance with applicable environmental, safety, and health requirements or to meet Department objectives. Environmental remedial actions are activities undertaken to assess, characterize, and clean up environmental contamination resulting from releases of hazardous and radioactive substances during facility operations or waste storage and disposal activities. The "other" environmental, safety, and health activities include (1) decontamination and decommissioning (D&D) of inactive facilities that previously handled or processed nuclear materials, (2) radioactive waste management projects to address the backlog of waste, and (3) several special cleanup and D&D projects managed by DOE Headquarters.

Subsequent sections of this report contain more detailed information on each of these categories and summarize projections of the environmental, safety, and health resource needs identified through the fall of 1988 by the individual DOE field and program offices. Section 2 describes projected environmental, safety, and health base program needs, and Section 3 describes projected activities and resource needs for environmental, safety, and health corrective actions; environmental remedial actions; and the "other" DOE environmental, safety, and health activities. Appendix A lists the DOE sites included in this needs assessment; Appendix B summarizes projected environmental, safety, and health activities for each site; and Appendix C discusses projected activities and resource needs for each of the major DOE program offices. Volume 2 of this report contains summaries developed from

Environment, Safety, and Health Long-Range Plans submitted by the individual DOE sites and operations. Summaries are presented in Volume 2 for 45 DOE sites and 4 special cleanup projects (Surplus Facility Management Program, Formerly Utilized Sites Remedial Action Project, Uranium Mill Tailings Remedial Action Project, and West Valley Demonstration Project). Discussions in Volume 1 regarding corrective and remedial actions, decontamination and decommissioning, and defense waste management projects relate only to the 45 DOE sites. The four special cleanup projects are discussed separately in Section 3.4.

This report builds on the information presented in a July 1988 resource needs report on the DOE Defense Programs complex* by updating information for the defense complex sites; adding information from the other DOE sites; and expanding the scope to include radioactive waste management, decontamination and decommissioning of inactive facilities, and other activities for which the Department has environmental, safety, and health responsibility. Two other DOE reports deal with related issues within the defense complex: (1) an Environmental Survey Report** and (2) the Modernization Study.*** The survey report summarizes and ranks preliminary results of an environmental survey conducted at the DOE defense production facilities. The Modernization Study deals with replacing or refurbishing aging nuclear weapons facilities to ensure that facilities in the Defense Programs complex are operated in a safe and environmentally acceptable manner.

It should be noted that this report is limited to an assessment of environmental, safety, and health needs identified by the DOE field organizations and Headquarters. This is not a planning document, and detailed analyses of the needs, along with prioritization, validation, funding, and program planning, are outside the scope of the report.

The amounts stated in this report are a compilation of site-specific needs based on the assumption that budgets would be unconstrained. Neither the activities nor the associated resource needs have been validated or prioritized on a Departmental basis. Validation and prioritization of needs, as well as planning and budgeting, will be accomplished through the environment, safety, and health long-range planning process that the Department is establishing.

This report covers all DOE programs and operations except the Naval Reactors Program and the Civilian Radioactive Waste Management Program. The Naval Reactors Program is managed by a joint DOE-Navy organization and is assigned the responsibility for all matters pertaining to naval nuclear propulsion by Executive Order 12344 and statute (Public Law 98-525). The program is not included in this report because of the nature of its activities and facilities. The Civilian Radioactive Waste Management Program was established by public law and is paid for from user fees. No environmental, safety, and health corrective action or environmental cleanup resource needs are projected for this program. The estimated fee for DOE high-level waste to be placed in the civilian repository is included under the waste management base program (Section 2.3).

* *Environment, Safety, and Health Report for the Department of Energy Defense Complex*, U.S. Department of Energy, Washington, D.C., 1988.

** *Environmental Survey Preliminary Summary Report of the Defense Production Facilities*, U.S. Department of Energy, Washington, D.C., 1988.

*** *United States Department of Energy Nuclear Weapons Complex Modernization Study*, U.S. Department of Energy, Washington, D.C., 1988.

2. ENVIRONMENTAL, SAFETY, AND HEALTH BASE PROGRAM ACTIVITIES

Environmental, safety, and health activities are an integral, continuing part of operations at all DOE facilities and sites. The DOE environmental, safety, and health base program consists of routine, day-to-day activities to ensure that facilities are operated in a safe and environmentally sound manner consistent with DOE and other Federal, state, and local regulations, standards, directives, and orders established to protect the environment and the safety and health of workers and the public. The base program consists of (1) environmental activities, (2) safety and health activities, and (3) waste management activities.

Funding for environmental, safety, and health base program activities has increased steadily from about \$0.4 billion in FY 1984 to \$1.4 billion (including waste management) in FY 1989. The funding level is expected to continue to increase and is projected to reach an annual average of \$1.8 billion for the period 1989 through 2010. These increases reflect the large number of assessments the Department is performing in response to changing requirements, lower levels of risk acceptable by the public, and increased emphasis on independent oversight to ensure compliance with applicable requirements.

2.1 ENVIRONMENTAL BASE PROGRAM ACTIVITIES

Environmental base programs at DOE facilities include activities in the areas of air quality, water quality, solid waste management, National Environmental Policy Act (NEPA) compliance, radiation protection, environmental oversight, and environmental reporting.

The Department's air quality protection policy is to control airborne emissions in a

manner that protects human health and safety and complies with applicable Federal, state, and local requirements. The compliance strategy is based on provisions of the Clean Air Act (CAA) and the Atomic Energy Act (AEA). The AEA requires that all DOE facilities maintain radionuclide emissions at levels as low as reasonably achievable (ALARA). Specific base program activities to maintain compliance at DOE facilities include permitting; air quality and impact assessment; monitoring of source and ambient conditions; operation and maintenance of air emission control equipment; dispersion and pathway modeling; training of personnel; development of plans, strategies, and administrative controls; and research and development efforts.

The objective of the DOE water pollution control program is to ensure that liquid effluents meet or exceed all regulatory requirements, including those established pursuant to the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), the AEA, the Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendments (HSWA) of 1984, and applicable state requirements. The water quality base program activities include permitting, operating and maintaining wastewater treatment facilities, sampling and analyzing liquid discharges, monitoring ambient groundwater and surface-water quality, developing water use and pollution control strategies and plans, assessing impacts on water resources, training personnel, and conducting research and development efforts.

Base program activities in the solid waste management area are intended to ensure that the generation, treatment, storage, and disposal of solid and hazardous wastes comply with the requirements of RCRA, HSWA, the Toxic Substances Control Act (TSCA), and

applicable state and local requirements. Base program activities include operating and maintaining solid waste management units; assessing solid waste management facilities and operations; identifying deficiencies; developing strategies and plans to address deficiencies; permitting for operation and closure of waste management units; tracking, sampling, and analyzing wastes; conducting RCRA groundwater monitoring and RCRA postclosure monitoring and compliance activities; developing plans and strategies to reduce, minimize, and recycle solid wastes; and conducting research and development efforts.

Base program activities to ensure compliance with NEPA include assessment of NEPA applicability and requirements; preparation of NEPA documentation, including environmental impact statements (EISs), environmental assessments (EAs), and findings of no significant impacts (FONISIs); assessment of the adequacy of existing NEPA documentation; and preparation of supplemental documentation.

The DOE radiation protection policy is intended to ensure that radiation emissions from DOE facilities are maintained at levels that are as low as reasonably achievable (ALARA). Radiological releases are regulated by DOE Orders established pursuant to the AEA, the CAA, and the SDWA. Radiation protection base program activities include monitoring of releases; modeling of radionuclide transport and fate; monitoring of air, groundwater, surface water, soil, biota, and foodstuffs; estimating doses; developing improved methods for sampling, detecting, and analyzing radionuclides; training personnel; and developing strategies and plans to fulfill environmental radiation protection requirements.

A crucial component of the environmental base program is the internal DOE oversight system, which is administered at three levels — (1) by the operating contractors through internal self-assessments, (2) by the DOE operations and program offices through their respective environment oversight roles, and (3) by Headquarters through the oversight role vested

in the Assistant Secretary for Environment, Safety and Health. Oversight activities include audits, inspections, standards development, personnel training, Environmental Surveys, and development and tracking of action plans and programs to address environmental problems.

The environment base program also includes activities undertaken to ensure compliance with other pertinent laws and regulations, including the Endangered Species Act, the National Historic Preservation Act, and the Federal Insecticide, Fungicide and Rodenticide Act.

2.2 SAFETY AND HEALTH BASE PROGRAM ACTIVITIES

As with the environmental base program, similar day-to-day efforts must be maintained to ensure continuing safety and health oversight and compliance activities. Safety and health base program activities are organized into seven key areas of focus: nuclear safety, radiation protection, industrial safety, fire protection, industrial hygiene, occupational medicine, and emergency preparedness.

Department of Energy Orders establish requirements to ensure that the safety of each DOE-owned nuclear facility is properly analyzed, evaluated, and approved. The orders also ensure that nuclear facilities are sited, designed, constructed, modified, operated, maintained, and decommissioned in a manner that provides adequate protection for health and safety and is in accordance with uniform standards, guides, and codes. The Department is in the process of revising and enhancing nuclear safety requirements that will provide further assurance that each DOE-owned nuclear facility is properly operated. Selected activities within the base program for nuclear facilities safety include enhancing safety appraisals, improving technical specifications, increasing training and qualifications, improving quality assurance methods, expanding independent review and appraisal, and updating safety documentation. In some cases, activities that originated as corrective actions are

now an integral part of the nuclear safety base program. This is likely to continue in the future, and thus the funding required for the base program is also likely to increase to accommodate the strengthened program for ensuring safety and health.

Radiation protection base program activities include control and confinement of contamination; development of internal dosimetry models and dose calculation techniques; radiation worker training (including training of a larger fraction of the work force); maintenance of records systems (including automated data retrieval systems); maintenance, calibration, and testing of instruments; development of written procedures and documentation; replacement of tritium control and monitoring equipment; and operation of an as-low-as-reasonably-achievable (ALARA) program, which provides coordinated goals and controls for radiation protection that apply to all sites under DOE supervision.

The DOE base program for industrial safety includes repairing and improving facilities, increasing worker and supervisor training, increasing attention to construction practices and to contractor training, improving data collection and accident analysis, and enhancing safety at explosives facilities.

Fire prevention and protection program activities ensure that no threat to the public health or welfare will result from fire, no undue hazards exist to employees from fire, vital DOE programs do not suffer unacceptable delays as a result of fire, and property damage from fires can be held to acceptable levels. The fire protection base program involves such activities as maintaining fire protection water supplies; maintaining fire alarm systems; and operating and maintaining fire protection equipment, systems, and installations.

Industrial hygiene activities include characterization of the workplace; maintaining exposure histories of workers; upgrading analytical facilities and equipment; implementing the Carcinogen Control Program and Hazards

Communication Program; implementing respiratory protection programs; upgrading ventilation systems; instituting more broadly based hearing conservation programs; improving documentation and internal review systems; increasing illumination; and enhancing filter testing to ensure containment of toxic and radioactive materials.

Department Orders prescribe the required emergency management systems, emergency planning, preparedness, and response capabilities for all DOE operations. DOE has several ongoing and planned activities to ensure that its facilities are in a state of readiness to handle potential emergencies. These activities include maintaining emergency operating plans, improving on-site communications capabilities, employing computer-based personnel accounting systems, and conducting exercises with the surrounding communities to test emergency plans.

2.3 WASTE MANAGEMENT BASE PROGRAM ACTIVITIES

The waste management base program activities provide safe processing, utilization, and storage or disposal of DOE radioactive waste pending implementation of long-term disposal technologies. This objective is achieved through careful operation, maintenance, and monitoring of interim facilities. The base program includes operating and maintaining high-level waste (HLW) storage tanks, bins, and related processing and storage facilities; operating and maintaining low-level waste (LLW) disposal sites; storing transuranic (TRU) waste, with retrieval, processing, and preparation for emplacement at the Waste Isolation Pilot Plant Facility near Carlsbad, New Mexico; operating low-level liquid waste treatment facilities; operating filter testing facilities; and processing low-level gaseous effluents.

The defense waste management research and development program, which is also part of the base program, is directed toward reducing waste generation rates and improving long-term management of DOE radioactive waste.

Technology alternatives are developed for each waste type, and the associated hazards, costs, and environmental impacts are assessed to select and implement options for cost-effective and safe long-term disposal.

For high-level waste, the development program is directed toward achieving permanent disposal in a geologic repository. The highly radioactive portion of the waste will be immobilized in borosilicate glass or other long-term matrix, placed into steel canisters, and stored on-site until a repository is available. The other less radioactive portion will be solidified in grout to produce a material called saltstone, which will be disposed of on-site as low-level waste. The technology is being adapted for the various forms of high-level waste at each site.

The defense transuranic waste development program objectives are to minimize the generation of new TRU waste, to ensure that the waste is safely isolated from the biosphere, and to reduce the costs for waste handling and disposal. Processes also are being developed to reduce waste through materials substitution and segregation of TRU waste from other nonradioactive waste in the production process. The Department also is developing technologies for characterization, in-situ immobilization, exhumation, processing, and certification of buried TRU waste, as well as for transporting TRU waste to the Waste Isolation Pilot Plant.

The program for low-level waste involves developing, demonstrating, and implementing new and improved waste minimization, treatment, and disposal techniques. It also involves developing and implementing standards for acceptable waste forms, segregating below-

regulatory-concern waste, and monitoring disposal facilities.

The DOE's future radioactive waste management costs will include a fee to store high-level radioactive wastes from DOE programs in the planned geologic repository. This fee is projected to total \$3.2 billion from 1991 through 2010 (included in the base program in this report) and \$3.0 billion beyond 2010.

2.4 RESOURCE NEEDS

As shown in Figure 1, the average annual base program resource needs (based on projections from FY 1989 through FY 2010) are estimated to be \$1.8 billion. Of this amount, 23% is for environmental activities, 35% for safety and health activities, and 42% for the radioactive waste management base program activities and repository fee. (As indicated above, the average annual waste management base program resource needs include the \$3.2 billion waste repository fee for the period 1991-2010, but not the \$3.0 billion post-2010 repository fee.)

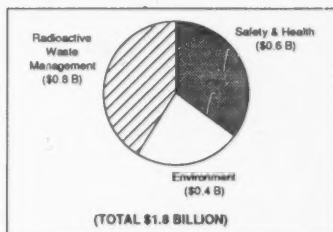


FIGURE 1: PROJECTED AVERAGE ANNUAL COST OF DOE ENVIRONMENTAL, SAFETY, AND HEALTH BASE PROGRAM ACTIVITIES

3. CORRECTIVE, REMEDIAL, AND OTHER ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES

3.1 OVERVIEW

The activities and resources needed by the Department to attain compliance with environmental, safety, and health legislative and regulatory standards and requirements are identified in this section. The activity categories discussed are (1) environmental, safety, and health corrective actions; (2) environmental remedial actions, including cleanup of contaminated sites; and (3) other environmental, safety, and health activities, including decontamination and decommissioning, defense waste management projects, and budgeted line-item cleanup programs.

The information presented in this section is

a compilation of activities and resource needs (in terms of FY 1990 dollars) projected by DOE field organizations and programs. This is not a planning document, and detailed analysis, prioritization, validation, program planning, budgeting, and funding for these needs are beyond the scope of the report.

Because of the great uncertainties in the nature, scope, and magnitude of the remedial and corrective actions, the sites were requested to provide two scenarios of resource needs. These are the "expected" and "high" scenarios (see Figure 2). The scenarios reflect possible variability in application of existing environ-

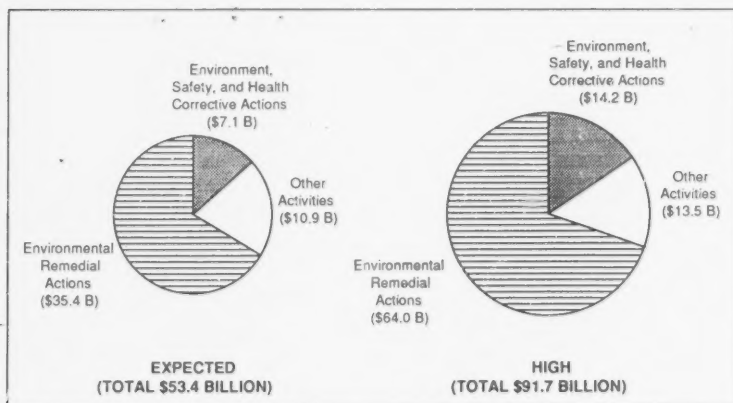


FIGURE 2: PROJECTED DOE ENVIRONMENTAL, SAFETY, AND HEALTH NEEDS ABOVE BASE PROGRAM

mental, safety, and health standards, regulations, and policies. The "expected" projections represent each site's independent judgment of what activities and resources are most likely to be needed to meet existing requirements and DOE environmental, safety, and health objectives. The "expected" projection is not a minimum requirements case, but rather it represents the most likely requirements given the unique characteristics of the site. The "high" projection represents each site's judgment of what activities and resources could be required to meet different applications of those existing requirements and standards that could be imposed on the site.

Information submitted by the field offices indicates that 33 of the 45 DOE sites included in this report either are conducting or anticipate conducting environmental, safety, and health corrective actions to bring existing facilities or operations into compliance with current regulations and requirements or meet Department objectives. Thirty-seven of the 45 sites report environmental remedial action needs. In addition, 20 of the 45 sites report needs for decontamination and decommissioning of inactive facilities and/or discrete radioactive waste management projects.

Figure 2 shows that projected resources needed to carry out these activities total \$53.4 billion for the "expected" scenario, including \$7.1 billion (13%) for environmental, safety, and health corrective actions, \$35.4 billion (66%) for environmental remedial action, and \$10.9 billion (21%) for other environmental, safety, and health activities. For the "high" scenario, the projected resource needs increase to \$91.7 billion, including \$14.2 billion (15%) for environmental, safety, and health corrective actions, \$64.0 billion (70%) for environmental remedial actions, and \$13.5 billion (15%) for the "other activities" category.

3.2 ENVIRONMENTAL, SAFETY, AND HEALTH CORRECTIVE ACTIONS

Environmental, safety, and health corrective actions are nonroutine, discrete activities undertaken at active sites and facilities to

achieve compliance with applicable regulations, requirements, and DOE Orders. These corrective actions have been classed into two categories: (1) environmental and (2) safety and health. Descriptions and key areas of focus for each category are presented below.

Projected resources necessary to complete all environmental, safety, and health corrective actions are shown in Figure 3. Under the "expected" scenario, resource needs of \$7.1 billion are projected. Of this total, 50% is for environmental corrective actions and 50% is for safety and health corrective actions. Under the "high" scenario, this increases to a total of \$14.2 billion (66% for environmental and 34% for safety and health). For the "high" case, the overall emphasis shifts to environmental corrective actions because of the degree of uncertainty in application of Federal, state, and local environmental regulations regarding solid waste corrective actions.

3.2.1 ENVIRONMENTAL CORRECTIVE ACTIONS

Environmental corrective actions include three major categories: air, water, and solid waste management. Most of the DOE sites have ongoing environmental corrective actions that involve activities to assess and characterize needs as well as to implement necessary corrective actions. Thirty-one of the 45 sites included in this report identify environmental corrective action needs.

Air corrective actions include discrete activities to bring facilities and operations into full compliance with the Federal Clean Air Act and state regulatory requirements, as well as with DOE Orders requiring that all DOE facilities maintain radionuclide emissions at levels as low as reasonably achievable (ALARA). Twenty of the 45 sites report air corrective action needs. Examples of such activities identified by the sites include installing and upgrading (1) ventilation, exhaust, and air filtration systems; (2) air monitoring stations; and (3) emission control systems for particulate materials, nitrogen oxides, sulfur oxides, hydrocarbons, radionuclides, and hazardous metals and compounds. Air

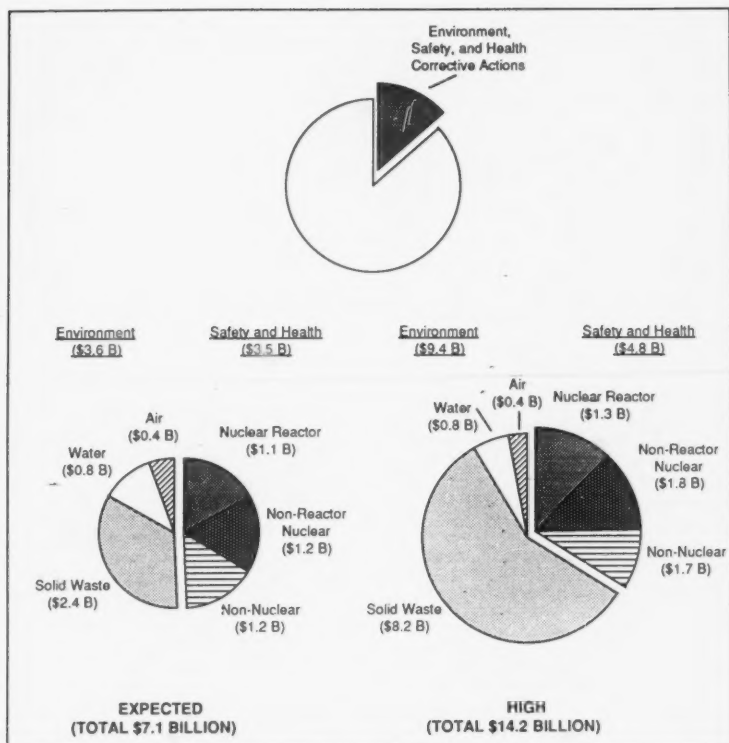


FIGURE 3: PROJECTED NEEDS FOR ENVIRONMENTAL, SAFETY, AND HEALTH CORRECTIVE ACTIONS AT DOE SITES

corrective actions also include modifying processes or installing improved equipment to eliminate or reduce air emissions. An example is installing incinerators to eliminate open burning of explosive wastes to meet state requirements. Although corrective action requirements vary by site, several similar problems occur at a number of sites. For example, because of the age of some facilities, many of the ventilation, exhaust, and air filtering systems are inadequate and must be upgraded.

Another air corrective action required at several sites is upgrading of air monitoring stations. The most common type of air corrective action identified by sites is to reduce emissions of regulated or potentially hazardous materials.

Twenty-nine of the 45 sites have identified corrective actions required to bring facilities into full compliance with water pollution control

requirements of the Clean Water Act, the Safe Drinking Water Act, the Resource Conservation and Recovery Act, the Atomic Energy Act, and applicable state and local statutes and regulations.

Water corrective actions include installing or upgrading facilities to treat wastewaters from processes, laboratories, cooling towers, and sanitary facilities; constructing systems to collect and retain contaminated runoff water; installing, upgrading, repairing, or separating stormwater and process wastewater sewer systems; establishing or upgrading wastewater sampling and analysis capabilities; and developing wastewater monitoring systems. Corrective actions also include developing nonpoint source pollution controls; eliminating wastewater line cross connections; flood-proofing tank farms, buildings, and waste treatment, storage, and disposal facilities; and reducing thermal discharges. Elimination or reduction of discharges to surface water or groundwater through modification of processes or development of alternative treatment or disposal methods is also identified at several sites.

Twenty-eight of 45 sites identify corrective action needs to bring solid waste management operations and facilities into full compliance with the Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendments of 1984, RCRA underground storage tank regulations, the Toxic Substances Control Act, and applicable state statutes and regulations.

Examples of RCRA solid waste corrective actions include installing and upgrading treatment, storage, and disposal facilities for hazardous and radioactive mixed wastes; installing groundwater monitoring wells; and constructing leachate collection and treatment systems. Corrective actions for underground storage tanks include upgrading or replacing tanks and installing cathodic protection systems. Projects to reduce or eliminate solid waste streams through process modification, chemical substitution, recycling, reuse, and reclamation also are identified.

Under the "expected" scenario, the projected environmental corrective action resource needs total \$3.6 billion — 10% for air, 21% for water, and 69% for solid waste (Figure 3). For the "high" scenario, the total increases to \$9.4 billion. Of this total, 4% is for air, 9% for water, and 87% for solid waste.

3.2.2 Safety and Health Corrective Actions

Safety and health corrective actions are necessary to provide a safe and healthful workplace, ensure the safety of personnel and property, and control all operational risks to acceptably low levels. Corrective actions necessary to address current requirements have been categorized into three areas: nuclear reactor facilities, non-reactor nuclear facilities, and non-nuclear facilities. These categories reflect the three broad types of facilities in which the DOE must ensure the safety and health of the public and the on-site personnel through compliance with specific DOE Orders and prudent operating practices.

Twenty-seven of the 45 sites included in this report identify safety and health corrective action needs in one or more categories. Of these 27 sites, 7 sites identify nuclear-reactor corrective actions, 15 sites identify non-reactor nuclear corrective actions, and 24 sites identify non-nuclear corrective actions.

Radiation protection is a key area of focus at the nuclear reactor and non-reactor nuclear facilities. Recent changes to the Department's radiation protection regulations require safety upgrades; additional and more detailed exposure-information reporting; expanded workplace air monitoring; and additional dose measurement and assessment, contamination control, and dosimetry instrumentation.

Current safety and health corrective activities at the Department's nuclear reactor and non-reactor nuclear facilities include implementing new safety objectives, conducting a risk-based approach for helping to ensure safety through risk assessments focused on potential

vulnerabilities to severe accidents, and performing seismic analyses and testing to help identify and implement any needed structural and component upgrades. These activities could result in additional resource needs for corrective actions.

Key areas of focus for corrective actions in the non-nuclear category include asbestos abatement, fire protection upgrades, and ventilation system upgrades. During the construction of many older DOE facilities, and in subsequent years, asbestos was used extensively for its thermal insulating properties and resistance to chemical attack. The Occupational Safety and Health Administration (OSHA) regulation was revised in 1986 with detailed requirements for control of potential asbestos exposure. Activities to meet these requirements include maintaining exposures to below permissible limits by an accelerated substitution policy, regulating work areas with the potential for asbestos exposure, measuring and evaluating employee risks by more job-specific exposure monitoring, and following more stringent controls for remedial action work (e.g., removal of large areas of asbestos).

To achieve improved DOE risk criteria, it will be necessary for many sites to upgrade their fire protection systems. Factory Mutual audits of the sites have helped in developing the strategy for meeting this objective. The necessary actions may include installing automatic suppression systems in critical facilities; upgrading alarm systems; improving fire protection and suppression systems to provide the necessary redundancy, reserve, and pump capacity; improving personnel fire protective equipment; and modifying on-site facilities to meet current life safety code requirements.

Another key area of focus common to many sites is improvement of ventilation systems. This activity includes replacing aging and contaminated ventilation equipment; installing new ventilation systems to achieve the most stringent level of operation; and upgrading ventilation systems that are deteriorating or are performing poorly.

As indicated in Figure 3, the resources needed for these safety and health corrective activities total \$3.5 billion for the "expected" scenario, increasing to \$4.8 billion for the "high" scenario. For the "expected" scenario, 31% of the total is for nuclear reactor facilities, 34% for non-reactor nuclear facilities, and 35% for non-nuclear facilities. For the "high" scenario the breakdown is 27% for nuclear reactor, 38% for non-reactor nuclear, and 35% for non-nuclear.

3.3 ENVIRONMENTAL REMEDIAL ACTIONS

Environmental remedial actions are those activities undertaken to assess, characterize, and clean up existing environmental contamination resulting from releases of hazardous and radioactive substances during previous facility operations. Remediation may involve cleanup of the soil, surface water, or groundwater and may include in-place stabilization or removal and disposal of bulk wastes.

The requirements for the identification, assessment, investigation, and remediation of past and present disposal sites and areas of environmental contamination are set forth under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA), Resource Conservation and Recovery Act (RCRA), and state laws and regulations.

The Department has undertaken several major activities to be responsive to these statutory and regulatory requirements, including the following:

- Establishing an environmental restoration procedure that includes site identification and assessment, contaminant confirmation, remedial action selection, remedial action implementation, and post-action monitoring;

- Establishing an environmental restoration program within each of the major Headquarters program offices (Defense Programs, Nuclear Energy, Energy Research, Fossil Energy, and Conservation and Renewable Energy);
- Conducting an independent Environmental Survey to identify areas of existing or potential environmental contamination that may require further investigation or remediation;
- Actively negotiating Interagency Agreements under CERCLA; and
- Negotiating state and/or Federal consent orders and compliance agreements regarding soil and groundwater contamination at RCRA areas.

Each of the DOE sites has initiated a program to meet the remedial action requirements under RCRA, CERCLA, and state regulatory programs. The sites are addressing the restoration of waste sites and of environmental contamination areas to mitigate existing or potential soil and/or groundwater contamination and to eliminate future contamination sources. Supporting these activities are identification and prioritization of sites; investigation of the nature and extent of contamination; and investigation of subsurface conditions, migration pathways, and aquifer systems.

The types of remediations that will or could be required at DOE facilities include, but are not limited to, source control remediations to stabilize wastes and prevent their migration; removal and treatment of soils, sediments, and groundwaters; remediation of stream and river bed sediments contaminated by previous waste practices or spills, to include stabilization and/or removal and treatment of contaminated sediments; prevention of overland transport (runoff); installation of caps to prevent or minimize release of gaseous contaminants; and

minimization of precipitation infiltration, thus minimizing liquid contaminant releases.

Because of the scope and complexity of the problems, remedial actions are projected to continue significantly longer than environmental corrective actions at most sites. Since the characterization and assessment phase has just started at many of the DOE sites, the remedial action needs identified by the various facilities are more speculative than those needs identified for other actions. In many cases, new techniques will have to be developed and implemented to address the unique situations existing at many of the waste sites.

For this report, environmental remedial activities have been divided into two categories: (1) assessment and characterization and (2) cleanup. The assessment and characterization category consists of activities to identify contaminants, determine the extent of contamination, specify cleanup requirements, and select a remedial action. Cleanup includes implementation of the selected remedy.

Thirty-seven of the 45 sites identify environmental remedial actions either in progress or anticipated. The major assessment and characterization needs involve identifying and quantifying surface and subsurface contamination, performing remedial investigations/feasibility studies (RI/FSs) under CERCLA, and performing RCRA facility investigations (RFIs). The major remedial cleanup needs identified by the sites involve soil and groundwater remediation to address contaminants such as volatile and semivolatile organics (e.g., trichlorethylene, petroleum distillates), heavy metals, polychlorinated biphenyls (PCBs), asbestos, and radionuclides.

As indicated in Figure 4, the total resource needs for all environmental remedial actions (characterization, assessment, and cleanup) are projected to be \$35.4 billion for the "expected" scenario and \$64.0 billion for the "high" scenario. Of those totals, about 5% is for characterization and assessment and 95% is for cleanup.

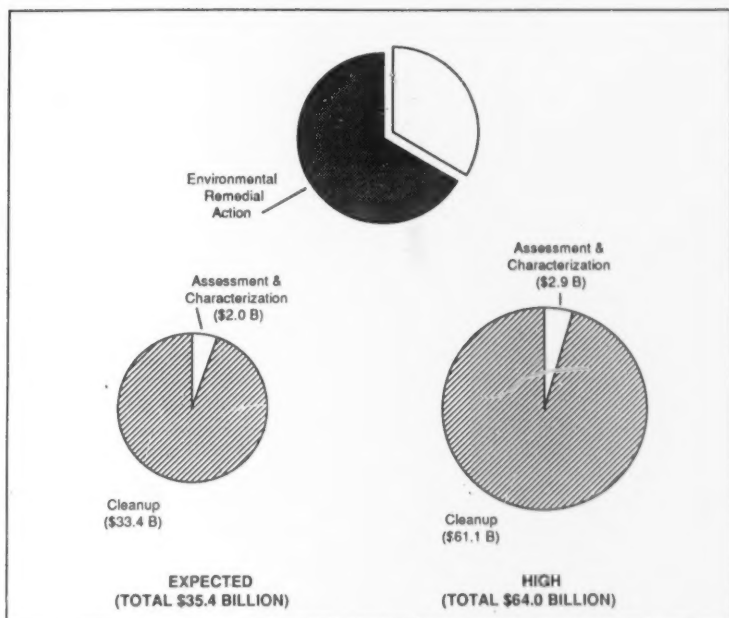


FIGURE 4: PROJECTED NEEDS FOR ENVIRONMENTAL REMEDIAL ACTIONS AT DOE SITES

3.4 OTHER ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES

Other major environmental, safety, and health efforts being conducted by the DOE include (1) decontamination and decommissioning of inactive facilities previously involved in handling or processing of nuclear materials for DOE programs, (2) discrete defense waste management projects, and (3) special remedial action and D&D projects at inactive sites and facilities and contaminated vicinity properties. Many of those sites and facilities were used in the past by the DOE or its predecessor agen-

cies; others were privately operated and have been assigned by Congress to DOE for remediation. These special projects include the Surplus Facilities Management Program (SFMP), the Formerly Utilized Sites Remedial Action Project (FUSRAP), the Uranium Mill Tailings Remedial Action Project (UMTRAP), and the West Valley Demonstration Project (WVDP).

Figure 5 shows that the combined projected resource needs for activities in the "other" category total \$10.9 billion for the "expected" case and \$13.5 billion for the "high" case. Of

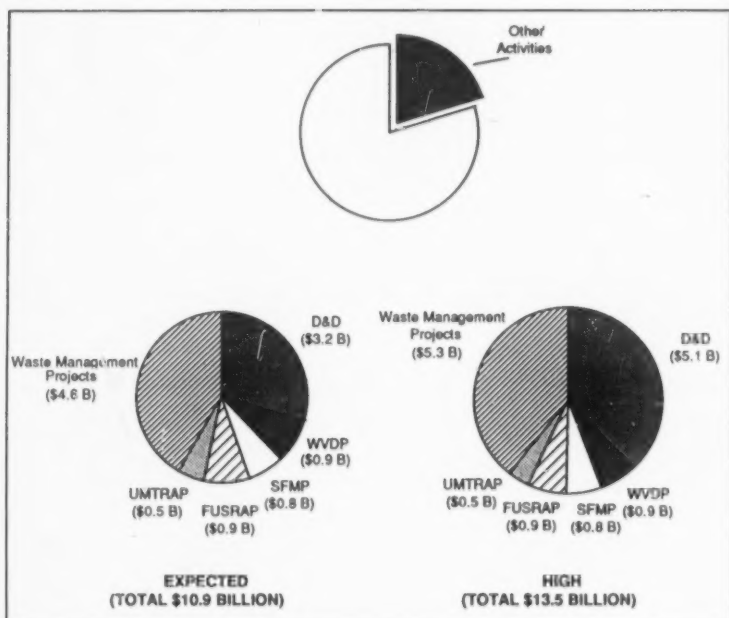


FIGURE 5: PROJECTED NEEDS FOR OTHER ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES

(Note: UMTRAP = Uranium Mill Tailings Remedial Action Project; FUSRAP = Formerly Utilized Sites Remedial Action Project; SFMP = Surplus Facilities Management Program; WVDP = West Valley Demonstration Project)

the total for the "expected" scenario, 28% is for D&D activities, 42% is for waste management projects, 8% is for SFMP, 9% is for FUSRAP, 4% is for UMTRAP, and 9% is for WVDP. For the "high" scenario, 37% is for D&D, 40% is for waste management projects, 6% is for SFMP, 7% is for FUSRAP, 3% for UMTRAP, and 7% is for WVDP.

3.4.1 Decontamination and Decommissioning Activities

Decontamination and decommissioning (D&D) activities apply to facilities that are identified as inactive or "planned shutdowns" and are contaminated with radioactive and/or hazardous chemical components. These activities involve dismantling and/or cleaning up the

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contaminated facilities. Needs for D&D activities have been identified by sites within the Defense (DP), Nuclear Energy (NE), and Energy Research (ER) program offices.

The DOE anticipates D&D activities at a variety of inactive facilities, ranging from a single contaminated laboratory building to large reactor complex sites with multiple facilities. Because of this variation and complexity, the reporting of D&D activities is divided into those activities associated with the Defense Programs (which is the major program having the large, complex sites) and those activities associated with other DOE program offices (i.e., NE and ER). In many cases, the D&D activities at a DOE site containing more than one inactive facility to decontaminate and decommission involve more than one DOE program office. However, in this report, unless specifically designated otherwise, the D&D activities are assigned to the "landlord" DOE program (i.e., the DOE program office having the primary responsibility for the site).

As shown in Figure 5, the projected needs for all of these D&D activities total \$3.2 billion for the "expected" scenario and \$5.1 billion for the "high" scenario.

3.4.1.1 Defense-Related Decontamination and Decommissioning Activities

A number of facilities used in the past for production and utilization of nuclear materials for defense purposes are now inactive or require continuous surveillance and maintenance to ensure that any remaining contamination (radioactive and/or hazardous substances) poses no danger to the environment or to public health. Some inactive facilities have already been decommissioned, and others have been reused; however, there are about 220 facilities that have no potential future use and are awaiting D&D at sites where DP is the designated landlord. These facilities include shutdown reactors, processing facilities, laboratories, and other contaminated buildings or structures at the Feed Materials Production Center, Hanford Site, Idaho National Engineering Laboratory,

Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Mound, Savannah River, and Oak Ridge Y-12 sites. Defense Programs also is responsible for D&D of the Oak Ridge Gaseous Diffusion Plant, with funding to be shared by NE and DP. The key area of focus of the defense D&D program is to manage the cleanup of inactive facilities that were used to support past DOE defense-related activities and now have no identified future use. The D&D projects are conducted in accordance with program priorities, applicable requirements and regulations, and available resources. The D&D program provides for routine surveillance and maintenance to ensure that the facilities remain in a safe condition before decommissioning. The major program objectives are to (1) make the facilities, equipment, and materials available for reuse; (2) provide for safe, long-term containment/disposal of contaminated material associated with a facility; and (3) return the real property to unrestricted use where appropriate. The program also provides for the development of new technologies and technology exchange activities with other government and commercial nuclear programs (both domestic and foreign).

Estimated resources needed to manage the currently identified facilities in the defense D&D program range from \$2.6 billion for the "expected" scenario to \$4.3 billion for the "high" scenario. The needs associated with D&D of inactive facilities not yet identified as part of the defense D&D program are currently being determined.

3.4.1.2 Other Decontamination and Decommissioning Activities

Several DOE facilities used for nondefense research, development, special processing, and/or production of nuclear materials also have become radioactively contaminated. Many of these facilities are now inactive and require continuous surveillance and maintenance. Some of these facilities have been decommissioned, and others are in the process of being scheduled for decommissioning. Nuclear Energy (NE) and Energy Research (ER) are the

designated landlords for these nondefense facilities.

Nuclear Energy is the designated landlord for Argonne National Laboratory - West and Santa Susana Field Laboratory. Energy Research is the designated landlord for Argonne National Laboratory - East, Brookhaven National Laboratory, Laboratory for Energy Related Health Research (UC Davis), Oak Ridge Associated Universities, and Oak Ridge National Laboratory.

Many of the D&D programs associated with these NE and ER sites are similar to the Surplus Facilities Management Program (SFMP) (Section 3.4.3), which provides D&D services for designated inactive contaminated facilities that were utilized in civilian nuclear programs under the Atomic Energy Act. However, the D&D activities identified in this section do not include those funded under SFMP or any of the other designated remedial action programs (i.e., FUSRAP or UMTRAP).

Projected resources needed to manage and decommission the currently identified facilities in this category range from \$0.6 billion ("expected" scenario) to \$0.7 billion ("high" scenario). Facilities at various DOE sites other than those identified in this report also are being examined for possible D&D. The resources needed to decommission these other facilities will be estimated as the D&D requirements for each facility are determined. The resource needs reflected in this report are only for those facilities that are currently identified for D&D activities.

3.4.2 Defense Waste Management Projects

A large inventory of radioactive waste has been generated by defense-related programs since initiation of the Manhattan Project in the early 1940s. Since then, the DOE and its predecessor agencies have continued to generate radioactive waste, much of which also contains chemically hazardous components, in the research, development, production, and testing of nuclear materials and weapons. Under

the terms of the Atomic Energy Act, the Department is responsible for developing radioactive waste disposal technologies and for designing, constructing, and operating storage and disposal facilities for its waste. The defense waste management projects are currently carried out through DOE's defense waste management program. The key areas of focus in this section are the discrete projects necessary to provide for the safe storage, immobilization, and ultimate disposal of high-level waste (HLW), transuranic (TRU) waste, and low-level waste (LLW). (It should be noted that the overall radioactive waste management program also includes the base program and repository fee, which are discussed in Section 2.3.)

High-level waste is any highly radioactive waste material resulting from the processing of spent nuclear fuel that contains long-lived radionuclides in sufficiently high concentrations as to require permanent isolation. At present, HLW is stored as liquids, solids, salts, and sludge in tanks at the Savannah River and Hanford sites, and as calcine in bins at the Idaho National Engineering Laboratory. New and readily retrievable HLW will be immobilized for disposal in a geologic repository. Immobilization will involve processing the HLW in new plants at the three sites — the Defense Waste Processing Facility at Savannah River, the Waste Vitrification Plant at Hanford, and the Waste Immobilization Facility at the Idaho National Engineering Laboratory. Treatment of HLW at other sites will be determined on a site-specific basis.

Transuranic waste is any radioactive waste that is contaminated with significant quantities of long-lived, alpha-emitting, transuranic radionuclides (radionuclides with atomic numbers greater than that of uranium) with half-lives greater than 20 years and concentrations greater than 100 nanocuries per gram at the time of assay. The TRU wastes result from the production of nuclear fuel, weapons fabrication, and spent fuel processing. Most of the DOE's stored TRU waste is at the Idaho National Engineering Laboratory. Transuranic wastes are being certified for safe disposal at

the Waste Isolation Pilot Plant (WIPP), a geologic repository for TRU waste disposal demonstration near Carlsbad, New Mexico. Management of TRU waste will involve use of the Stored Waste Examination Pilot Plant (SWEPP) and the Processing Experimental Pilot Plant (PREPP), both at Idaho National Engineering Laboratory, as well as facilities planned for the Savannah River and Hanford sites to retrieve and process stored TRU waste.

Low-level waste is radioactive waste not classified as HLW, TRU waste, spent nuclear fuel, or by-product material. The objective of the defense LLW program is to provide safe and environmentally acceptable disposal of LLW by shallow land burial while improving the cost effectiveness of LLW treatment, disposal, and long-term management activities and developing improved waste forms and engineered barriers where necessary. The Department is increasing efforts to improve the performance of the overall LLW management system, from generation through storage, treatment, disposal, and (ultimately) closure of disposal sites.

Projections of resource needs for the defense waste management projects total \$4.6 billion to \$5.3 billion for the "expected" and "high" scenarios, respectively. Of those totals, about 55% is for the immobilization and ultimate disposal of HLW, 13% is for TRU waste projects, and 32% is for projects associated with the LLW management program, including demonstration and application of near-surface engineered disposal concepts, such as above- and below-grade concrete vaults and enhanced trench design.

3.4.3 Surplus Facilities Management Program

The DOE established the Surplus Facilities Management Program (SFMP) in 1978 to provide for safe management, decontamination, and disposal of surplus DOE contaminated facilities. The program includes provisions for the surveillance, maintenance, and ultimate disposition of contaminated facilities and sites.

Areas of focus vary from site to site, but in general include decontamination and decommissioning of inactive facilities; characterization and cleanup of contaminated waste sites; waste treatment and storage; and environmental monitoring. Several significant projects within SFMP include the Weldon Spring Site Remedial Action Project, near St. Louis, Missouri; the Shippingport Station Decommissioning Project, near Shippingport, Pennsylvania; the Battelle Columbus Laboratories Decommissioning Project, near Columbus, Ohio; and the Monticello Remedial Action Project, in southeastern Utah. Through 1995, DOE efforts will be directed toward completing the remedial investigation/feasibility study-environmental impact statement (RI/FS-EIS) for Weldon Spring and initiating remedial actions at the site. The Shippingport project will be completed in 1991, and the Battelle decommissioning project is scheduled to begin in FY 1990. Finally, the DOE is scheduled to complete RI/FS activities for the Monticello project and initiate remedial action in FY 1991.

The projected resource needs for completion of the current SFMP inventory total \$0.8 billion.

3.4.4 Formerly Utilized Sites Remedial Action Project

The Formerly Utilized Sites Remedial Action Project (FUSRAP) was established in 1974 to identify sites used by the DOE predecessor agencies (Manhattan Engineer District and Atomic Energy Commission) and reevaluate and remediate, if necessary, the radiological conditions at these sites. Additional sites, used essentially for commercial ventures, have been added to FUSRAP by separate legislative actions for decontamination research and development.

Manhattan Engineer District and Atomic Energy Commission records have been reviewed to compile a list of these formerly utilized sites and assess DOE's responsibility for any potential residual contamination. Currently, 29 FUSRAP sites or vicinity properties are

designated for remedial action plus one site designated for radiological monitoring only. Several minor sites may be added to FUSRAP during the completion of designation surveys in 1989 and 1990. Of the 30 current sites, work has been completed at 8, and cleanup is underway at 13 others. Through 1995, DOE efforts will be directed toward developing waste disposal sites and conducting remedial actions at the FUSRAP sites in Missouri, New York, and New Jersey.

The projected resource needs to complete all the FUSRAP activities total \$0.9 billion.

3.4.5 Uranium Mill Tailings Remedial Action Project

The mission of the Uranium Mill Tailings Remedial Action Project (UMTRAP) is to conduct remedial actions on radioactive materials at 24 inactive uranium mill processing sites and several thousand associated vicinity properties. The project was mandated by the Uranium Mill Tailings Radiation Control Act of 1978 (Public Law 95-604). Of the 24 principal sites, 9 are designated as high priority, 6 as medium priority, and 9 as low priority. Remedial actions were completed or underway at more than half of the sites by the end of 1988.

Remedial actions at the principal processing sites include assessment of conditions, followed by stabilization and eventual disposal of radioactive materials. The program also includes identification and cleanup of several thousand vicinity properties contaminated with radioactive material derived from the processing sites. The program for each site includes preparation of engineering plans and environmental documents for the cleanup and disposal operations. The final disposal site will be federally owned and maintained under license to the Nuclear Regulatory Commission (NRC).

The various remedial actions are being conducted in accordance with cooperative agreements negotiated with the affected states and Indian tribes. The concurrence of the NRC also is required for each site remedial action plan.

An environmental monitoring program is conducted at all appropriate processing sites, disposal sites, and large vicinity properties to demonstrate compliance with appropriate standards, regulations, and orders. For sites requiring monitoring, data are collected before remedial actions are started in order to characterize preproject conditions. The program is designed to monitor both radioactive and nonradioactive constituents in air, surface water, and groundwater.

The projected resources needed to complete UMTRAP activities total \$0.5 billion. Federal funds are used for 90% of the remedial action costs (100% for those sites on Indian lands), and the states provide the balance of the costs.

3.4.6 West Valley Demonstration Project

The Congressionally mandated West Valley Demonstration Project, a high-level radioactive waste management project, is being conducted by the DOE at a former commercial nuclear fuel reprocessing plant. The Western New York Nuclear Services Center, located near West Valley, New York, is the site of the only commercial nuclear fuel reprocessing facility ever to have operated in the United States. Nuclear Fuel Services Co. was the facility operator. The plant reprocessed 640 metric tons of spent nuclear fuel from 1966 to 1972. The reprocessing operations generated approximately 2 million liters of highly radioactive liquid waste currently stored in two underground steel tanks located inside concrete vaults. The plant closed in 1972 for expansion, but the facility never resumed operations and was permanently closed in 1976. The site is owned by the New York State Energy Research and Development Authority.

On October 1, 1980, Congress passed the West Valley Demonstration Project Act (PL 06-368), directing the Secretary of Energy to (1) solidify the high-level waste in a form suitable for transportation and disposal; (2) develop containers suitable for permanent disposal of the high-level radioactive waste;

(3) transport the waste to a Federal repository for permanent disposal; (4) dispose of low-level and transuranic waste produced by the project; and (5) decontaminate and decommission the tanks, facilities, and any material and hardware used in connection with the project, in accordance with Nuclear Regulatory Commission requirements. The project is being carried out in two phases. Phase I is focused on solidification of the high-level wastes; Phase II will consist of decontamination and decommissioning of facilities used in Phase I.

The estimated resource needs for the remaining part of Phase I of the West Valley project total about \$0.4 billion. The early estimate of resource needs for Phase II is \$0.5 billion. The enabling act provides that 90% of the project costs are to be provided by

the Federal Government and 10% by the State of New York.

3.5 RESOURCE SUMMARY OF ENVIRONMENTAL, SAFETY, AND HEALTH NEEDS

Environmental, safety, and health resource needs for corrective and remedial actions identified by all of the DOE sites are summarized in Figure 6. It is important to note that Figure 6 merely presents a compilation of site-specific needs based on the assumption that funding levels would be unconstrained. Neither the activities nor the associated resource needs have been validated or prioritized on a departmental basis. Validation and prioritization of needs, as well as planning and budgeting, will

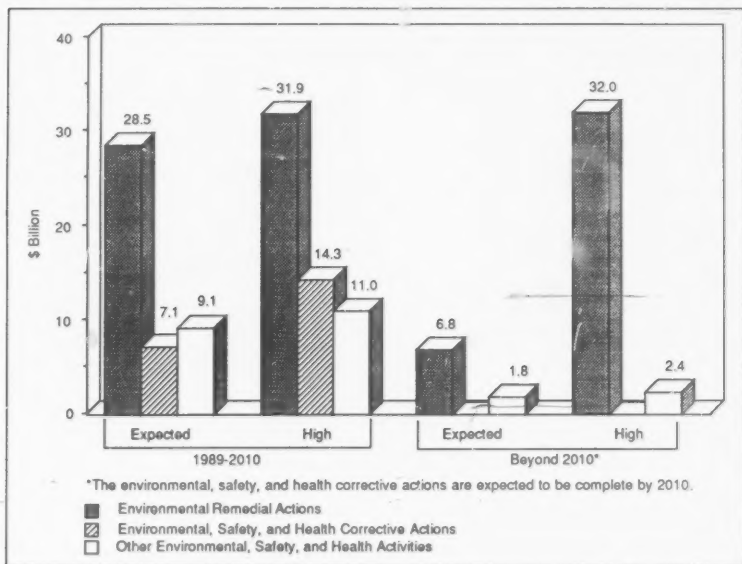


FIGURE 6: PROJECTED RESOURCE NEEDS BY TIME PERIOD

be accomplished through the environmental, safety, and health long-range planning process that the Department is establishing.

The timing of activities and the levels of resource needs illustrated in Figure 6 are expected to change as needs are validated and prioritized and departmental plans and budgets are established. However, Figure 6 does demonstrate several important points. First, the total projected resource needs for environmental, safety, and health activities, exclusive of base program activities, are large, ranging from an "expected" total of \$53 billion to almost \$92 billion.

Second, there is a large, long-term mortgage that will extend beyond FY 2010 for environmental remedial actions at complex sites, such as Hanford. The Department is working with the U.S. Environmental Protection Agency and appropriate state agencies to investigate the nature and extent of contamination at the Department's sites and to assess and select remedial actions for the sites.

Third, assuming unconstrained funding levels, most of the environmental, safety, and health corrective actions necessary to bring operating facilities into full compliance with current requirements and objectives could be completed by FY 2000, and all could be completed by FY 2010.

Finally, schedules and resource needs for most of the projects in the "other" environmental, safety, and health activities category are relatively well defined. The Uranium Mill Tailings Remedial Action Program, the Surplus Facilities Management Program, and the Formerly Utilized Sites Remedial Action Project are expected to be completed by 1994, 2000, and 2002, respectively. Projected resource needs for the "other" category after the year 2000 are primarily for decontamination and decommissioning activities and completion of waste management projects.

Changes in requirements or funding levels, decisions on remedial actions required, and identification of additional facilities that require decontamination and decommissioning could increase the out-years mortgage substantially and/or extend the time required to achieve environment, safety, and health objectives.

It must be reiterated that this report is limited to a preliminary assessment of environmental, safety, and health needs identified by the DOE Headquarters and field organizations. This is not a planning document, and detailed analysis of the needs, along with prioritization, validation, funding, and program planning, are outside the scope of the report.

APPENDIX A:

DOE SITES INCLUDED IN THIS REPORT^a

Site	Operations Office ^b	Location
DEFENSE PROGRAMS		
Feed Materials Production Center	ORO	Fernald, Ohio
Hanford Site	RLO	Richland, Washington
Idaho National Engineering Laboratory	IDO	Idaho Falls, Idaho
Kansas City Plant	ALO	Kansas City, Missouri
Lawrence Livermore National Laboratory	SAN	Livermore, California
Los Alamos National Laboratory	ALO	Los Alamos, New Mexico
Mound Plant	ALO	Miamisburg, Ohio
Nevada Test Site	NVO	Las Vegas, Nevada
Oak Ridge Gaseous Diffusion Plant	ORO	Oak Ridge, Tennessee
Pantex Plant	ALO	Amarillo, Texas
Pinellas Plant	ALO	Largo, Florida
Residual Nuclear Explosive Sites	NVO	U.S. and Mid-Pacific Area
Rocky Flats Plant	ALO	Golden, Colorado
Sandia National Labs. - Albuquerque	ALO	Albuquerque, New Mexico
Sandia National Labs. - Livermore	ALO	Livermore, California
Savannah River Site	SRO	Aiken, South Carolina
Waste Isolation Pilot Plant	ALO	Carlsbad, New Mexico
Y-12 Plant	ORO	Oak Ridge, Tennessee
ENERGY RESEARCH		
Ames Laboratory	CHO	Ames, Iowa
Argonne National Laboratory - East	CHO	Argonne, Illinois
Brookhaven National Laboratory	CHO	Upton, New York
Continuous Electron Beam Accelerator Facility	ORO	Newport News, Virginia
Fermi National Accelerator Laboratory	CHO	Batavia, Illinois
Inhalation Toxicology Research Institute	ALO	Albuquerque, New Mexico
Laboratory for Energy-Related Health Research	SAN	Davis, California
Lawrence Berkeley Laboratory	SAN	Berkeley, California
Oak Ridge Associated Universities	ORO	Oak Ridge, Tennessee
Oak Ridge National Laboratory	ORO	Oak Ridge, Tennessee
Princeton Plasma Physics Laboratory	CHO	Princeton, New Jersey
Stanford Linear Accelerator Center	SAN	Stanford, California
NUCLEAR ENERGY		
Argonne National Laboratory - West	CHO	Idaho Falls, Idaho
Paducah Gaseous Diffusion Plant	ORO	Paducah, Kentucky

Site	Operations Office ^b	Location
Portsmouth Gaseous Diffusion Plant	ORO	Piketon, Ohio
Santa Susana Field Laboratory	SAN	Canoga Park, California
CONSERVATION AND RENEWABLE ENERGY		
Solar Energy Research Institute	CHO	Golden, Colorado
FOSSIL ENERGY		
Component Development and Integration Facility	IDO	Butte, Montana
Morgantown Energy Technology Center	HDQ	Morgantown, West Virginia
National Institute for Petroleum Research	HDQ	Bartlesville, Oklahoma
Naval Petroleum Reserves No. 3	HDQ	Casper, Wyoming
Naval Oil Shale Reserves Nos. 1, 2, and 3	HDQ	Rifle, Colorado, and Vernal, Utah
Naval Petroleum Reserves of California	HDQ	Tupman, California
Pittsburgh Energy Technology Center	HDQ	Pittsburgh, Pennsylvania
Strategic Petroleum Reserve	ORO	Various locations in Louisiana and Texas, with headquarters in New Orleans, Louisiana
POWER MARKETING ADMINISTRATIONS		
Bonneville Power Administration	HDQ	Portland, Oregon
Western Area Power Administration	HDQ	Golden, Colorado

^a This list does not include four special programs and projects discussed separately in this report. These are the Formerly Utilized Sites Remedial Action Project, the Surplus Facilities Management Program, the Uranium Mill Tailings Remedial Action Project, and the West Valley Demonstration Project.

^b

- ALO = Albuquerque Operations Office
- CHO = Chicago Operations Office
- HDQ = Headquarters
- IDO = Idaho Operations Office
- NVO = Nevada Operations Office
- ORO = Oak Ridge Operations Office
- RLO = Richland Operations Office
- SAN = San Francisco Operations Office
- SRO = Savannah River Operations Office

ENVIRONMENTAL, SAFETY, AND HEALTH NEEDS IDENTIFIED AT DOE SITES^{a,b}

[illegible]

Site	Env. Remedial Action	Corrective Actions							Rad. Waste Projects
		Environmental			Safety & Health			D&D	
		Air	Water	Solid Waste	Nuclear Reactor	Non-Reactor Nuclear	Non- Nuclear		
Y-12 Plant	X	X	X	X	-	X	X	X	X
ENERGY RESEARCH									
Ames Lab.	X	-	-	-	-	-	-	-	-
Argonne National Lab. - East	X	-	X	X	X	-	-	X	-
Brookhaven National Lab.	X	-	X	-	X	-	X	X	X
Continuous Electron Beam Accelerator Facility	-	-	-	-	-	-	-	-	-
Fermi National Accelerator Lab.	X	-	-	-	-	-	-	-	-
Inhalation Toxicol. Research inst.	X	-	X	X	-	-	-	-	X
Lab. for Energy- Related Health Research	X	-	-	-	-	-	-	X	-
Lawrence Berkeley Lab.	X	X	X	X	-	-	X	-	-
Oak Ridge Assoc. Universities	X	-	-	-	-	-	-	X	-
Oak Ridge National Lab.	X	-	-	-	X	-	X	X	X
Princeton Plasma Physics Lab.	-	-	-	-	-	-	-	-	-
Stanford Linear Accel. Center	-	-	X	X	-	-	-	-	-
NUCLEAR ENERGY									
Argonne National Lab. - West	X	-	-	-	-	-	X	X	X
Paducah Gaseous Diffusion Plant	X	X	X	X	-	X	X	-	X

Site	Env. Remedial Action	Corrective Actions							Rad. Waste Projects
		Environmental			Safety & Health			D&D	
		Air	Water	Solid Waste	Nuclear Reactor	Non-Reactor Nuclear	Non- Nuclear		
Portsmouth Gaseous Diffusion Plant	X	X	X	X	-	X	X	-	X
Santa Susana Field Lab.	X	X	X	X	-	-	X	X	-
CONSERVATION AND RENEWABLE ENERGY									
Solar Energy Research Inst.	-	-	-	X	-	-	X	-	-
FOSSIL ENERGY									
Component Development and Integration Facility	-	-	-	-	-	-	-	-	-
Morgantown Energy Technology Cntr.	X	X	X	X	-	-	-	-	-
National Institute for Petroleum Research	X	-	X	-	-	-	X	-	-
Naval Petroleum Reserves No. 3	X	-	-	-	-	-	-	-	-
Naval Oil Shale Reserves Nos. 1, 2, 3	X	-	-	-	-	-	-	-	-
Naval Petroleum Reserves of Calif.	X	X	X	X	-	-	X	-	-
Pittsburgh Energy Technology Cntr.	-	-	X	X	-	-	X	-	-
Strategic Petroleum Reserve	-	-	X	-	-	-	-	-	-

Site	Env. Remedial Action	Corrective Actions							Rad. Waste Projects
		Environmental			Safety & Health			D&D	
		Air	Water	Solid Waste	Nuclear Reactor	Non-Reactor Nuclear	Non- Nuclear		
POWER MARKETING ADMINISTRATIONS									
Bonneville Power Adm.	X	X	X	X	-	-	-	-	-
Western Area Power Adm.	X	-	-	X	-	-	-	-	-

*This list does not include four special programs and projects discussed separately in this report. These are the Formerly Utilized Sites Remedial Action Project, the Surplus Facilities Management Program, the Uranium Mill Tailings Remedial Action Project, and the West Valley Demonstration Project.

^bAn "X" indicates that a site has identified a corrective or remedial action need (under either the "expected" or the "high" scenario) in the indicated functional category. A "-" indicates that a site has not identified any needs in the indicated category.

APPENDIX C:

RESOURCE NEEDS, EXCLUDING BASE PROGRAM,
BY DOE HEADQUARTERS PROGRAM OFFICE

The general objectives of the DOE Headquarters program offices are in the areas of defense, energy, and general science. Defense activities account for over half of the Department's budget and reflect the DOE's responsibilities for national security. The energy programs mainly pursue long-term research and development that the private sector cannot reasonably be expected to undertake. General science objectives include basic research in high-energy physics, nuclear physics, basic energy sciences, and life sciences.

Program descriptions, key areas of focus, and projected environmental, safety, and health

activities and associated resource needs (above base program) are presented in this appendix for Defense Programs, Energy Research, Nuclear Energy, Conservation and Renewable Energy, Fossil Energy, and Power Marketing Administrations. Figures are included in the discussions of projected resource needs (above base program) by program office. The total resource needs are shown by program office in Figure C.1. The values of resource needs in this appendix are given in millions of dollars to make the needs for smaller programs more apparent.

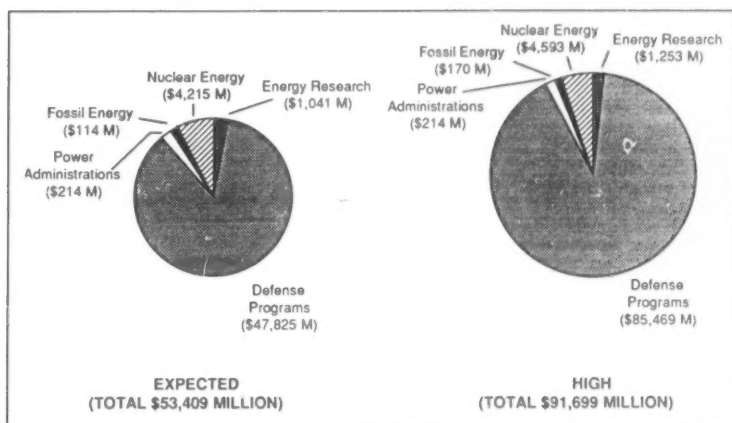


FIGURE C.1: PROJECTED NEEDS FOR ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES BY PROGRAM OFFICE

(Note: The Conservation and Renewable Energy Program reports no major remedial or corrective action needs and, therefore, does not appear in this figure.)

C.1 DEFENSE PROGRAMS

The primary mission of Defense Programs (DP) is to support national security policies of the United States for a nuclear deterrent by (1) conducting research and development in the military application of atomic energy; (2) producing and maintaining nuclear weapons and nuclear materials and processing waste from those activities; and (3) assessing foreign nuclear weapon capabilities and compliance with treaties.

The research and development activities support a broad-based and integrated scientific and technical program that ensures a long-term technology base focused on military applications. That base must be adequate to address changing requirements, to pursue scientific and technical opportunities related to the nuclear deterrent, and to preclude technological surprise that would give adversaries an unacceptable advantage. Specific applications of that technology base include basic and applied research dedicated to advancing state-of-the-art technology devoted to nuclear weapons applications, evaluation of technologies that adversaries could use to neutralize the nation's nuclear deterrent, and exploration and application of derivative concepts, such as nuclear-directed energy for military uses and inertial fusion for civilian uses.

Defense Programs has statutory cradle-to-grave responsibility for the nation's nuclear weapons. This responsibility includes engineering development, fabrication, and assembly of new nuclear weapons and components; lifetime maintenance and reliability assessment of the existing nuclear weapons stockpile; retirement and disposal of outdated weapons; and reprocessing of critical materials for use in the production cycle. Radioactive wastes generated from production are processed and prepared for ultimate disposal as part of the defense waste management program.

The DP supports the development and execution of national security and foreign poli-

cies in the areas of treaty verification, intelligence, and arms control. Many programs are conducted to research and develop the technology; fabricate the systems; and generate the analytical tools for verification of current and potential nuclear-related arms control treaties, such as the Threshold Test Ban Treaties and the Peaceful Nuclear Explosives Treaty, and to support the intelligence community in nuclear-related technical intelligence collection activities.

Defense Program activities are conducted in government-owned facilities that incorporate technologies ranging from nuclear reactors and chemical processing; through electronic componentry; and machining, foundry, and hand assembly operations. The DP has custodial responsibility for ensuring the capability and capacity of those facilities to fulfill national security requirements, as well as the responsibility for the safe operation of facilities, protection of workers and the public, and protection of the environment.

Figure C.2 shows that currently projected resource needs for environment, safety, and health activities for DP total between \$47,825 million and \$85,469 million ("expected" and "high" scenarios, respectively). Under the "expected" scenario, environmental corrective actions constitute 6% of the total, safety and health corrective actions 7%, environmental remedial actions 73%, decontamination and decommissioning 5%, and waste management projects 9%. Of the total amount for the "high" scenario, 10% is for environmental corrective actions, 5% for safety and health corrective actions, 74% for environmental remedial actions, 5% for decontamination and decommissioning, and 6% for radioactive waste management projects.

In the environmental arena, activities are segregated into those necessary to clean up contamination at inactive waste sites (remedial actions) and those focused on compliance with statutory requirements at active production sites (corrective actions). Near-term activities are

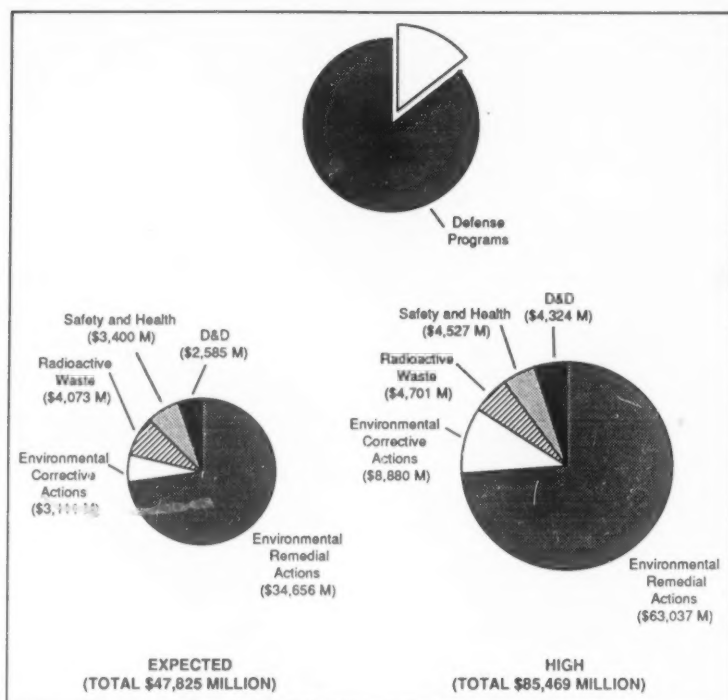


FIGURE C.2: PROJECTED NEEDS FOR ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES FOR DEFENSE PROGRAMS

focused on active production sites and the corrective actions necessary to address point-source emissions regulated under various air, water, and solid waste statutory requirements. Of the 18 DP sites included in this report, 13 identify needs for corrective actions relating to air, 15 identify needs for corrective actions relating to water, and 15 identify needs for corrective actions relating to solid waste.

For the remedial actions at inactive waste sites, near-term focus is directed at completing the remedial investigations and feasibility stud-

ies required by statute. Specific cleanup actions are being initiated in the near-term, but the magnitude of the effort is not expected to crest until after the mid-1990s. Seventeen DP sites have identified remedial action needs.

Related to inactive waste site cleanup is the decontamination and decommissioning (D&D) of inactive facilities contaminated with radioactive materials. Efforts are directed at those contaminated DP facilities to prepare them for future programmatic use, long-term containment of contamination, or eventual return to

unrestricted use. Nine of the DP sites report D&D activities. Ongoing surveys are developing an inventory of additional facilities that will come under this program.

Primary emphasis in radioactive waste management is on minimizing quantities of existing wastes and reducing the generation rate of new wastes. Major activities include developing and implementing technology to dispose of high-level waste (HLW), transuranic (TRU) waste, and low-level waste (LLW). Activities are underway to provide the technology and engineering necessary to process HLW into immobilized forms for ultimate disposal in a geologic repository. The goal of the TRU waste program is to end interim storage and achieve permanent disposal. The strategy for LLW is to improve the cost effectiveness of treatment, disposal, and long-term management activities and to develop improved waste forms and engineered barriers where necessary. Eight of the 18 DP sites report discrete radioactive waste management projects.

In the area of safety and health corrective actions, existing capabilities and technologies are being enhanced to address more rigid standards. For DP, upgrading nuclear reactor safety is the prime focus of safety and health activities in the near-term. In addition, recommendations from the National Academy of Sciences Interim Oversight Committee, the Advisory Committee on Nuclear Facility Safety, and the still undetermined scope of the Defense Nuclear Facility Safety Board are expected to have a significant impact on operational activities, especially within the next 5 years, in consolidated efforts to improve the safety and health posture of the DP facilities. Fifteen of the 18 DP sites have identified safety and health corrective action needs.

In July 1988, the document entitled *Environment, Safety, and Health Report for the Department of Energy Defense Complex* was forwarded to the Congress. That report aggregated the resource needs for the DP sites to address only the cleanup of environmental contamination at inactive waste sites and

compliance with environment, safety, and health requirements at active sites. The \$40 billion to \$70 billion estimates of necessary resources were based on each site's unique assessment of potential cleanup levels and compliance criteria. Other DP-related activities, such as radioactive waste management and decontamination and decommissioning of inactive facilities, were not included in the July report. In this report, assumptions of eventual cleanup levels and compliance criteria unique to each of the DP sites have not substantively changed from those included in the July report. Therefore, the range of resource needs to address those parallel activities remains approximately the same.

C.2 ENERGY RESEARCH

The goals of the Energy Research (ER) Program Office include producing the scientific and technical knowledge needed to develop energy technology options; maintaining competitiveness in energy research areas for which DOE is specifically responsible; and providing and operating the large-scale facilities required to conduct research in physical, energy, and life sciences.

Energy Research carries out a broad range of activities, including research in the basic energy sciences, high-energy and nuclear physics, magnetic fusion energy, and biomedical and environmental sciences, as well as other activities related to the Department's energy research and development (R&D) programs. Typical facilities at ER sites include particle accelerator; facilities to investigate the effects of radiation on human health; facilities for energy technology development; facilities to research new materials for improving energy technology; and a large number of basic chemistry, biology, and physics research laboratories.

As shown in Figure C.3, the projected environmental, safety, and health resource needs for Energy Research total \$1,041 million for the "expected" scenario and \$1,253 million for the "high" scenario at those sites for which

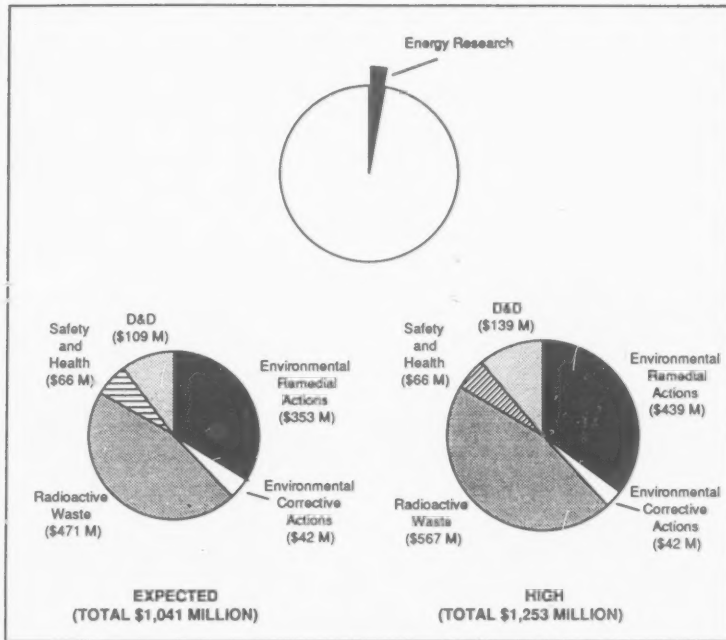


FIGURE C.3: PROJECTED NEEDS FOR ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES FOR ENERGY RESEARCH

ER is the landlord program. For both scenarios, environmental remedial action constitutes about 35% of the total, environmental corrective action 4%, safety and health corrective action 5%, radioactive waste management projects 45%, and D&D 11%.

Energy Research is the landlord program for 12 sites. Five of these sites identify environmental corrective action needs to achieve compliance with water pollution control requirements. The major corrective action needs involve upgrading or constructing industrial and sanitary wastewater treatment facilities and implementing groundwater protection require-

ments by reducing liquid effluents to soil. Four sites identify corrective action needs to achieve compliance with solid waste management requirements. The primary corrective action needs involve constructing and upgrading solid waste treatment, storage, and disposal facilities and closing solid waste disposal sites.

Three of the sites identify safety and health corrective action needs. Key areas of focus include asbestos abatement, fire protection upgrades, safety analysis, and nuclear safety upgrades. Asbestos abatement involves inspection, identification, and removal of asbestos in older facilities. Fire protection upgrades

include life safety code modifications, addition of suppression systems, early warning systems, and smoke ventilation systems. Safety analysis involves reactor accident assessments and safety analysis and review. Nuclear safety upgrades primarily involve facility upgrades.

Nine of the sites identify environmental remedial action needs. The major assessment and characterization needs are to identify and quantify surface and subsurface contamination, perform remedial investigations/feasibility studies (RI/FSs) under CERCLA, and perform RCRA facility investigations (RFIs). The major remedial cleanup needs identified by the sites involve soil and groundwater remediation to address contaminants such as volatile and semivolatile organics, heavy metals, polychlorinated biphenyls (PCBs), asbestos, and radionuclides.

Five of the sites for which ER is the landlord program identify decontamination and decommissioning activities, and three identify radioactive waste management projects.

C.3 NUCLEAR ENERGY

The principal activities of the Office of Nuclear Energy (NE) support the National Energy Policy Plan strategy of maintaining nuclear energy as one of the important parts of the nation's energy supply triad of coal, nuclear, and conservation. These activities are in the areas of research and development, uranium supply and enrichment, and military and civilian space and terrestrial requirements.

Nuclear Energy conducts research and development on innovative reactor systems and has constructed and operated many nuclear reactors and reactor-related technologies as part of the reactor research program. The uranium enrichment program, which provides fuel for standard light water reactors, includes gaseous diffusion plants (GDPs) at Paducah, Kentucky, and Portsmouth, Ohio. Special research is being conducted by NE to develop power reactors and radioisotope thermoelectric generators for space and terrestrial applica-

tions for NASA and the Department of Defense and in support of the Strategic Defense Initiative Program.

The Naval Reactors Program is managed by a joint DOE-Navy organization and is assigned the responsibility for all matters pertaining to naval nuclear propulsion by Executive Order 12344 and Public Law 98-525. Although it exists within NE, the program is not included in this report because of the nature of its activities and facilities.

In addition to its general mission and areas of responsibility, NE also has been assigned programmatic and oversight responsibilities for certain special remedial action projects at inactive sites previously operated by DOE predecessors and private industry. These projects are the Surplus Facilities Management Program (SFMP), Formerly Utilized Sites Remedial Action Project (FUSRAP), Uranium Mill Tailings Remedial Action Project (UMTRAP), and West Valley Demonstration Project.

The SFMP provides for the surveillance, maintenance, and ultimate disposition of radioactively contaminated surplus facilities and sites previously used by the Department and its predecessor agencies. The mission of the FUSRAP is to identify sites formerly utilized by the Manhattan Engineer District and the Atomic Energy Commission, to evaluate their current radiological condition, and to effect appropriate remedial action. The UMTRAP is responsible for remedial actions at 24 inactive uranium mill processing sites and several thousand associated vicinity properties. The West Valley Demonstration Project was mandated by Congress to carry out a high-level radioactive waste management demonstration project at West Valley, New York, the site of the only commercial nuclear fuel reprocessing plant ever operated in the United States. These special projects are further described in Section 3.4.

The estimated "expected" and "high" resource needs for NE's environmental, safety, and health activities total \$4,215 million and \$4,593 million, respectively (Figure C.4). Of

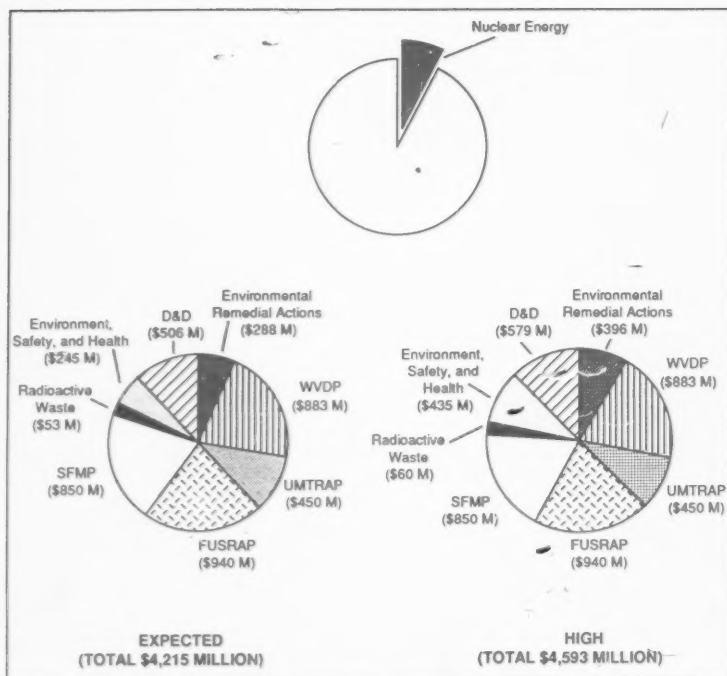


FIGURE C.4: PROJECTED NEEDS FOR ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES FOR NUCLEAR ENERGY

(Note: UMTRAP = Uranium Mill Tailings Remedial Action Project; FUSRAP = Formerly Utilized Sites Remedial Action Project; SFMP = Surplus Facilities Management Program; WVDP = West Valley Demonstration Project)

the total under the "expected" scenario, 6% is for environmental, safety, and health corrective action, 7% for environmental remedial action, 12% for decontamination and decommissioning at sites for which NE is the landlord program, 1% for radioactive waste projects, 20% for SFMP, 22% for FUSRAP, 11% for UMTRAP, and 21% for the West Valley project. Of the total for the "high" scenario, 9% is for environmental, safety, and health corrective action,

9% for environmental remedial action, 13% for decontamination and decommissioning at sites for which NE is the landlord program, 1% for radioactive waste projects, 19% for SFMP, 20% for FUSRAP, 10% for UMTRAP, and 19% is for West Valley.

Principal areas of environmental, safety, and health focus projected for NE are in the areas of corrective and remedial actions at the

Paducah and Portsmouth gaseous diffusion plants (GDPs); safety analysis at two NE reactors (the Experimental Breeder Reactor II [EBR II] at Idaho National Engineering Laboratory and the Fast Flux Test Facility [FFTF] at Hanford) and at the two GDPs; and the special remedial action projects listed above.

Nuclear Energy has several corrective actions either projected or underway to address areas of concern regarding emissions to the atmosphere. For example, chromium is used as a corrosion inhibitor in the cooling tower water at the Portsmouth and Paducah GDPs and is released to the atmosphere in water droplets that escape from the towers. In response to steps taken by EPA to develop a regulation restricting the use of chromium, a DOE program is underway to replace the chromium in the cooling tower water with a phosphate-based corrosion inhibitor. Corrective actions may also be needed in the GDP process buildings, where the ventilation systems contain gaskets impregnated with PCBs. Since this is not considered a closed system, the DOE may be required to remove and replace all the gaskets. Finally, in response to requirements currently being developed by the EPA, efforts may be required to reduce the emission of fluorides, which are utilized in the GDP process buildings.

Corrective actions in the area of waste and hazardous material management may also be required. The low-level radioactive wastes generated at the Paducah and Portsmouth facilities currently are being stored at the sites. Each facility will require an adequate disposal site for eventual disposition of the material. Also, asbestos is removed and disposed of on a continuing basis at the GDPs.

Safety analyses planned for the NE reactors and GDPs include full-scope probabilistic risk assessments (PRAs) for the FFTF and EBR-II reactors and may include limited-scope PRAs for the Paducah and Portsmouth GDPs. These PRAs may identify additional safety upgrades that would be needed.

Both GDPs are developing and implementing remedial action programs to comply with the requirements of RCRA and CERCLA. Agreements with regulators as to the scope and timing of the work are currently being negotiated at Paducah and Portsmouth.

C.4 CONSERVATION AND RENEWABLE ENERGY

The general mission of Conservation and Renewable Energy (CE) is to formulate and direct programs to increase the production and utilization of renewable energy and to improve efficiency of energy utilization, thus contributing to energy conservation.

Principal categories of activities designed to carry out this mission include promoting basic and applied research; pursuing implementation of energy efficiency measures at the Federal, state, and local levels; developing and implementing technology transfer programs in conservation and renewable energy; promoting the technological enhancement of electric energy systems' reliability, flexibility, and economic viability; and identifying opportunities for improving the stability, strength, and security of the nation's energy supply. Conservation and Renewable Energy also has the responsibility of overseeing and coordinating the policies and activities of the Alaska, Southeastern, and Southwestern Power Administrations to ensure that federally produced hydropower is marketed for widespread use at the lowest possible cost consistent with sound business principles, the law, and DOE policies. As part of its renewable energy program, CE manages the Department's Solar Energy Research Institute at Golden, Colorado.

For the period through FY 1995, CE contemplates no major environmental, safety, and health corrective or remedial actions above the base program. Inactive waste sites from previous occupants of the land at the Solar Energy Research Institute have been identified and evaluated. The EPA has already agreed that no further action is required with respect to

these sites. For the period beyond FY 1995, the major environmental, safety, and health focus will be on expanding the current environmental monitoring program at the proposed permanent Solar Energy Research Facility.

C.5 FOSSIL ENERGY

The Department's Fossil Energy (FE) Program Office has three complementary strategic goals: (1) maintain reasonable future domestic energy prices by promoting interfuel competition; (2) promote energy security and stability by increasing the effective resource base for liquid and gaseous fuels (which can substitute for liquid fuels in many applications); and (3) encourage international competitiveness of U.S. fuels and energy technologies. Fossil Energy pursues these goals through its involvement with applied research; exploratory development; and limited proof-of-concept testing involving coal, petroleum, and gas. This program provides the general technology and knowledge base that the private sector can use to complete development and start commercialization of advanced processes and energy systems.

Activities conducted by FE include research and development efforts to increase levels of production, transportation, and use of the nation's fossil fuel resources. The Strategic Petroleum Reserve, the Naval Petroleum and Oil Shale Reserves, and the Joint Government-Industry Clean Coal Technology Program also are major Fossil Energy activities.

As shown in Figure C.5, the projected environmental, safety, and health resource needs for FE total \$114 million for the "expected" scenario and \$170 million for the high scenario. For both scenarios, environmental corrective action needs constitute about 49% of the total, safety and health corrective actions 39%, and environmental remedial actions 12%.

In the area of environmental corrective actions, two of the eight FE sites that submitted material for this report identify corrective action needs to achieve compliance with air quality

requirements. The corrective actions involve reducing gaseous hydrocarbon emissions. Five FE sites identify corrective actions needs to achieve compliance with water pollution control requirements. Key areas of focus include upgrading and constructing industrial and sanitary wastewater treatment facilities, implementing groundwater protection requirements by monitoring underground storage tanks for leaks, and installing potable water systems. Three sites identify corrective action needs to achieve compliance with solid waste management requirements. These corrective actions include disposing of transformers contaminated with polychlorinated biphenyls (PCBs), upgrading solid waste storage facilities, minimizing waste volume, and closing solid waste disposal sites.

Three FE sites also identify corrective actions for safety and health. Key areas of focus include fire protection upgrades, asbestos abatement, corrective action at former oil shale and coal gasification sites, corrective action at tank farms, installation of monitoring equipment, and various facility upgrades. Fire protection upgrades include modification of existing systems and installation of new systems. Asbestos abatement is ongoing in older DOE facilities. Tank farm activities include removal of old tanks, repair of leaking tanks, and improvement of tank-sump and pond-containment barriers. Installation of monitoring equipment includes modification, improvement, and installation of leak detectors and groundwater monitoring instruments.

Five FE sites identify environmental remedial action assessment, characterization, and/or cleanup activities either underway or anticipated. The major assessment and characterization activities involve identifying and quantifying surface and subsurface contamination, performing remedial investigations/feasibility studies (RI/FSs) under CERCLA, or performing RCRA facility investigations (RFIs). The major remedial cleanup needs identified by the sites involve soil and groundwater remediation to address contaminants such as volatile and semivolatile organics and heavy metals.

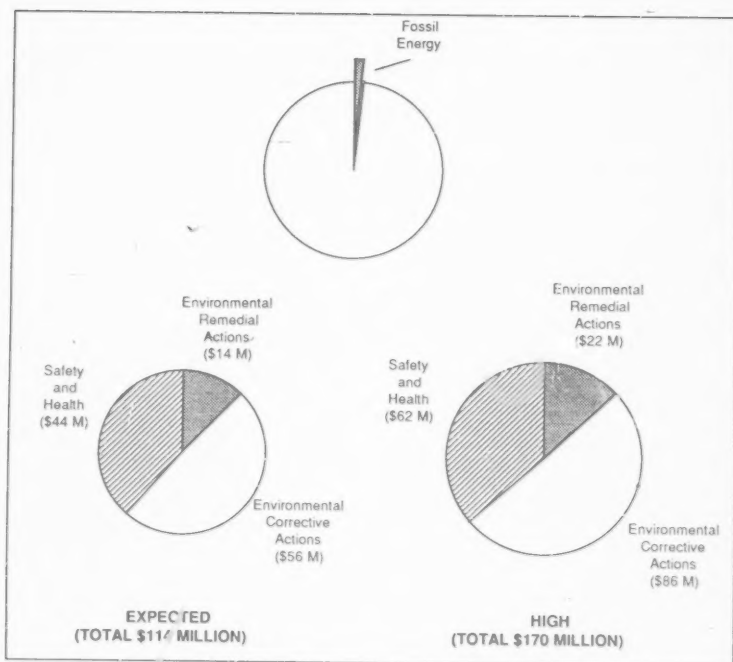


FIGURE C.5: PROJECTED NEEDS FOR ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES FOR FOSSIL ENERGY

C.6 BONNEVILLE AND WESTERN AREA POWER MARKETING ADMINISTRATIONS

The DOE markets electricity produced by Federal hydropower projects under its five power marketing administrations: Alaska Power Administration, Bonneville Power Administration (BPA), Southeastern Power Administration, Southwestern Power Administration, and Western Area Power Administration (Western). The revenues from the sale of electricity generated from these hydropower projects are deposited directly into the U.S. Treasury.

Western and BPA, the two largest DOE power marketing administrations, are discussed in this section. The other power marketing administrations are part of Conservation and Renewable Energy and are discussed in Section C.4 of this appendix.

The BPA was established in 1937 by an act of Congress to be the Federal wholesale marketing agency for electric energy generated at the Bonneville Dam and in later years was also designated as the marketing agency for electric power generated at a variety of other Federal hydroelectric facilities. The facilities of BPA

serve as the main power grid for the Pacific Northwest, providing approximately 70% of the region's bulk power transmission capacity. Electric power is sold to wholesale customers in Oregon, Idaho, and Washington; parts of Montana and Wyoming west of the Continental Divide; and small parts of northern Utah, Nevada, and California. The BPA also transmits surplus electric power to customers in Canada and California.

Western was established in 1977 pursuant to the DOE Organization Act and is responsible for the Federal electric power marketing and transmission functions in an area of 1.3 million square miles. This area includes 15 central and

western states: California, Nevada, Montana, Arizona, Utah, New Mexico, Texas, North Dakota, South Dakota, Iowa, Colorado, Wyoming, Minnesota, Nebraska, and Kansas.

As shown in Figure C.6, the projected environmental, safety, and health resource needs for BPA and Western total \$214 million for both the "expected" and the "high" scenarios. Of this, 29% is for environmental remedial actions and 71% is for environmental corrective actions.

BPA plans environmental corrective actions in the categories of water and solid waste management. Environmental remedial actions

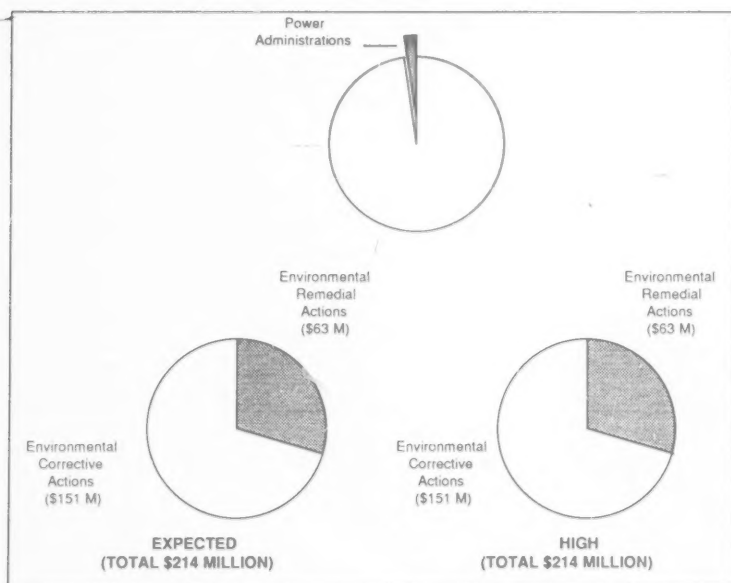


FIGURE C.6: PROJECTED NEEDS FOR ENVIRONMENTAL, SAFETY, AND HEALTH ACTIVITIES FOR BONNEVILLE AND WESTERN AREA POWER MARKETING ADMINISTRATIONS

are also planned for assessments, site investigations, feasibility studies, and other remedial actions as required by CERCLA and SARA. Principal contaminants of concern are PCBs and, to a more limited extent, volatile organic solvents. Under the water category, BPA facilities will be retrofitted with secondary containment systems as required by the Clean Water Act to prevent contamination of surface and groundwater.

Two environmental corrective actions planned at BPA fall under the solid waste management category. First, underground storage tank systems will be replaced, retrofitted, and, where required, cleaned up. The peak workload is expected to take place over a 10-year period (FY 1988 - FY 1998), after which time all tanks will have been replaced. The contaminants of concern are principally gasoline and diesel fuel. Cleanup levels will be determined on a case-by-case basis in consultation with EPA and appropriate state agencies.

The second corrective action requires that equipment be replaced and cleaned up as needed, pursuant to requirements of the Toxic Substances Control Act. The time frame re-

quired for this activity has not been determined, but it is expected to be completed within 16 to 25 years. Cleanup levels will be determined on a case-by-case basis in consultation with the appropriate EPA regional office.

Western has an environmental corrective action at the Hinton Hazardous Waste Storage Facility near Hinton, Iowa, and an environmental remedial action that involves the final minor payments toward cleanup of the Rose Chemical Superfund site near Holden, Missouri. Corrective action at Hinton is in response to a Federal Facilities Compliance Agreement to ensure correct storage of soil contaminated by pentachlorophenol. This activity should be completed in FY 1993. The remedial action is required at the Rose Chemical Superfund site because Western sent PCBs to that site and is therefore considered responsible for a proportionate share of cleanup costs. Payment has been made, and only minor expenses are expected for the duration of the cleanup project, which should be completed in 1 or 2 years.

All other environmental, safety, and health activities planned at BPA or Western are base program activities.